Connecticut
Registration Report

Births, Deaths, Fetal Deaths, and Marriages
Calendar Year 2018

State of Connecticut
Department of Public Health

Deidre Gifford, MD, MPH, Acting Commissioner

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Table of Contents

Registration Report Updates

On January 1, 2016, Connecticut transitioned from the 1989 Revision to the 2003 Revision of the U.S. Standard Certificate of Live Birth. Through adoption of the latest version of the birth certificate, the Connecticut birth registry now collects the same modernized health and medical information as the rest of the nation.

While much of the information collected on the birth certificate is not impacted by the Revision in 2016, several data elements are dropped, added, or modified, including:

- Race of the mother is now collected using multiple race checkboxes consistent with the federal standards for collecting race.
- Education of the mother reflects the highest degree attained rather than years completed.
- Smoking is collected separately for four time periods: the 3 months prior to pregnancy and each of the 3 trimesters.
- Deliveries occurring via Cesarean section are now queried for whether the mother had a Trial of Labor prior to delivery.
- Relating to maternal morbidity, 5 serious complications associated with labor/delivery are added.
- Breastfeeding of the infant prior to discharge from the hospital is added.
- Adequacy of Prenatal Care Utilization (APNCU) Index is no longer published due to poor data quality.
- Timing of initiation of prenatal care initiation is now calculated based date of first prenatal care visit.

These changes prompted substantial expansion and restructuring of *Registration Report* Tables beginning with the 2016 *Registration Report*. Birth, fetal death, and death data are presented across 30, instead of 14, *Report* Tables. Newly added *Report* Tables include births by selected parental social determinants of health and risk factors, births by selected characteristics of delivery and infant care, and the “Top Ten” Baby names in the state.

New for 2018, the *Registration Report* Tables are prefaced by a series of Population Health Highlights. Each Highlight provides a focal review of demographic patterns and temporal trends for important health outcomes or risk factors for Connecticut residents. Population Health Highlights replace the historical narrative format provided in previous *Reports* and allow for more in-depth analysis of selected health indicators. In future years, contingent on departmental resources, the agency will update and expand the series.

On January 1, 2018, Connecticut transitioned from the 1989 Revision of the U.S. Standard Certificate of Fetal Death to the 2003 Revision.

Connecticut continues to use the 2003 Revision of the U.S. Standard Certificate of Death which was adopted in 2005.

Introduction

The *Registration Report* is a statistical summary of vital events for the State of Connecticut. The State Office of Vital Records at the Connecticut Department of Public Health (DPH) maintains the statewide vital event registries for births, deaths, fetal deaths, and marriages. The series has a long history with annual *Reports* beginning in 1848 and with only one year lost in 1852. Although the narrative portion of the *Registration Report* is not created for 1999 through 2009 or for 2016 and 2017, *Report* Tables have been produced annually and are available online. The *Registration Report* supports the broad mission of DPH to protect and improve the health and safety of all residents of Connecticut by providing detailed annual data to facilitate public health research and program development and evaluation.

This introduction provides a general overview of key concepts for interpreting vital statistics data for Connecticut. A summary of recent updates to the *Registration Report* is provided as Connecticut's adoption of the 2003 version of the Birth Certificate in 2016 precipitated multiple changes to *Report* contents and structure finalized with this 2018 *Report*. Specific details on *Report* preparation methodology as well as other important resources for *Report* interpretation and use are provided as six Appendices I - VI.

Completeness of Registration

The State of Connecticut has a town-based civil registration system. Vital events are statutorily required to be registered with the town in which the event occurred, and a copy of that event certificate is shared with the individual's town of residence.

Connecticut's electronic birth registration system (EBRS), active since 2002, collects the birth registry information using a web-based data collection system which allows birth facilities and towns with home births to file births and all towns to register records electronically rather than using a paper-based registration process. Use of the EBRS ensures that Connecticut's registry for births that occurred in-state is essentially complete. As of 2018, the remaining three event registries (fetal death, death, and marriage) are paper-based and require the certifier of the vital event to initiate a paper certificate. For deaths and fetal deaths, the funeral director receives the paper certificate from the certifier and completes the registration process with the town clerk in the town of occurrence. A copy of the certificate is then provided to the individual's town of residence and a copy is provided to CT DPH for entry into the corresponding statewide registry. For marriages, the certifier files the marriage license with the town of occurrence and the town sends a copy to CT DPH for entry into the marriage registry. Due to the paper-based process, some certificates for deaths, fetal deaths, and marriages that occur in CT each year may not be reported to CT DPH and therefore are not entered into the registry systems for inclusion in this *Report*. Planned implementations of electronic registration systems for deaths, fetal deaths, and marriages will resolve the under-reporting of in-state occurrences.

The statistics presented in the *Registration Report* reflect not only vital events that occur in Connecticut, but also those involving Connecticut residents that occur in other states. The Connecticut Vital Records Office is part of a national association through which our state reciprocates with every state and territory in the U.S. to exchange copies of birth and death records. Events to CT residents that occur in other states and events to residents of other states that occur in CT are exchanged to allow each state to perform complete statistical reporting for state residents. Connecticut does not exchange fetal death or marriage records and therefore reporting of these events for CT Residents is known to be incomplete.

Geographic Levels

Summary statistics are reported at the state level for all Connecticut residents. Selected *Report* Tables also provide summary statistics by county, Local Health Districts (LHDs) that are comprised of two or more towns, and Connecticut's 169 towns. Summations for LHDs enable local health agencies to better understand and serve their resident populations. The composition of the respective health districts reflects membership as of July 1 of the *Registration Report* year (see listing and map in **Appendix II**).

Rates, Percentages, and Ratios

In addition to case counts, rates, percentages, and ratios form the foundation of the *Registration Report* Tables and Population Health Highlights. The term "rate" is used broadly throughout the *Report* to refer both to true epidemiological rates, which measure the frequency of an event per population per unit of time, as well as percentages, which are ratios of a part of a whole and do not depend on unit of time for calculation.[1] Rates and percentages are calculated using the equations given in **Appendix III**.

Caution should be used in drawing conclusions based on rates calculated from small numbers of events, as described in **Appendix V**. The term "unknown" as used in this *Report* includes both "missing" responses (no code entered) and responses coded as "unknown." Percentages based on data do not include records with unknown or missing values for the health outcome of interest in the denominator. Disparity Ratios are calculated as rates within one population group (the numerator) divided by the rate in a reference population group (the denominator) and highlight health inequities as the magnitude of a health outcome or risk factor in one population relative to another.

Population Estimation Methodology

Population estimates are used to calculate rates of births, deaths, fetal deaths, and marriages. The U.S. Census Bureau's Population Estimates Program issues annual population estimates for July 1 of each year by age, sex, race, and ethnicity for Connecticut and its 8 counties and for total population without demographics for Connecticut's 169 towns.

Reporting of Race and Ethnicity

Data from vital records that were collected using the 2003 Revisions of the vital event certificates reflect the current 1997 federal standards for collection of ethnicity separate from race and to allow multiple races to be reported.[2] For Connecticut, births from 2016 to present, deaths from 2005 to present, and fetal deaths from 2018 to present allow for reporting of multiple races (see Appendix ?). Data collected using the 1989 revision follow the 1977 federal standard allowing only a single race to be reported.[2]

The *Registration Report* provides rates and analyses for specific racial and ethnic groups using mutually exclusive combinations of race and ethnicity. Statistical tabulations by race in the *Registration Reports* reflect single race categorization (need citation for bridging) to allow for consistency in reporting over time (across revisions) and to allow for their inclusion in tabulations for which a population denominator is needed [cite]. Additional Hispanic origin categories are collected on the vital event certificates and are therefore available in the vital event registries for analyses, however annual population estimates for those Hispanic subgroups are not available from the U.S. Census Bureau's annual estimates for Connecticut.

For population-based rates that require use of the U.S. Census Bureau's annual population estimates as the rate denominator, race/ethnicity combinations are limited to non-Hispanic White, non-Hispanic Black, non-Hispanic American Indian/Alaskan Native, non-Hispanic Asian (includes Native

Hawaiian and Other Pacific Islander) and Hispanic of any race. For proportion-based rates, the categories are non-Hispanic White, non-Hispanic Black, non-Hispanic Asian (includes Native Hawaiian and Other Pacific Islander), non-Hispanic Other (includes race not otherwise categorized), and Hispanic (includes all races) as well as two Hispanic subgroups: Puerto Rican (includes all races) and Other Hispanic (includes Mexican, Cuban, or Other Hispanic for all races).

Infant's demographics

For birth statistics, the race, ethnicity, and residence of the infant is assumed to be that of the mother in accordance with national standards for vital statistics.[3] For infant deaths, the race, ethnicity, and residence reflect the information reported on the death certificate by the family. For statistics reported using the linked birth-infant death records, the race, ethnicity, and residence reflect the birth record which is that of the mother.[4]

Same-Sex Marriages

Same-sex marriages in Connecticut became possible on November 11, 2008. Information about same-sex marriages is included in this *Report*.

Divorces

Dissolutions of Marriage, also known as divorces, are handled by the Connecticut Superior Court system. As no divorce registry is maintained, divorce statistics are not included in this *Report*.

Comparability of Cause-of-Death Data

The International Classification of Diseases (ICD) is designed to promote international comparability in the collection, processing, classification, and presentation of mortality statistics. The ICD defines the universe of diseases, disorders, injuries and other related health conditions, listed in a comprehensive, hierarchical fashion that allows easier analysis of health information across entities, systems, regions, and countries as well as across different time periods.

The single selected cause for tabulation of mortality statistics is called the underlying cause of death, and the other reported causes are the non-underlying causes of death. The underlying cause-of-death is defined by the WHO as "the disease or injury which initiated the train of events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury." Underlying cause-of-death is selected from the conditions entered by the physician on the cause of death section of the death certificate. When more than one cause or condition is entered by the physician, the underlying cause is determined by the sequence of conditions on the certificate, provisions of the ICD, and associated selection rules and modifications (https://wonder.cdc.gov/wonder/help/mcd.html).

The ICD system for classifying cause of death is revised occasionally to reflect changes in medical practices and new medical knowledge. The *Registration Report* uses the tenth revision of the ICD (known as the ICD-10) which was implemented in the death and fetal death registries in 1999.

The National Center for Health Statistics (NCHS), the Federal agency responsible for use of the ICD in the U.S., has also developed a clinical modification of the classification for morbidity purposes. While the ICD-10 is used to code and classify mortality data from death certificates, the ICD-10-CM is used to classify morbidity with more detail for use in hospital care and related reimbursement purposes. The two systems (ICD-10 and ICD-10-CM) are similar but not interchangeable.

Availability on the Internet

Full *Reports* (1992-1998 and 2010-2015), *Report* Tables (1998-2018), and methods discussion (1999-2006) are available on the internet at the following web site:
http://www.ct.gov/dph/RegistrationReport

For Further Information

Definitions of the technical terms used in this document are given in the *Glossary* in **Appendix III**. For questions about this *Registration Report*, please contact the Health Statistics and Surveillance Section of the State of Connecticut Department of Public Health.

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Population Health Highlights

Singleton Preterm Birth

Infants born before 37 completed weeks of pregnancy are classified as preterm.[5] The earlier an infant is born, the higher the risk for disability or death due to incomplete fetal development.[6] Infants born preterm often face health issues related to their breathing and feeding, vision and hearing problems, and cerebral palsy.[6] Preterm birth, alongside low birthweight, is the second leading cause of infant death.[3] Preterm infants can also experience long-term intellectual or developmental issues related to their physical development, learning, communicating, self-care, and social interactions.[6,7]

Singleton preterm rate refers to the percentage of preterm births among single-infant deliveries only. Higher-order pregnancies (twins, triplets, etc.) are more likely to be born preterm due to the shared fetal environment.[8] Using singleton preterm rate instead of overall preterm rate allows for tracking and evaluation of rates of preterm over time or across populations without the added complication of varied rates of higher-order pregnancies in a population.[5]

Key Takeaways

- In 2018, CT's singleton preterm rate was 7.6% and marks the 4th year in a row the rates have risen or remained unchanged.
- Declining trends among NH Black and NH White infants that began in 2005 stabilized in 2014 and 2015.
- For 2014-2018, NH Black and Puerto Rican infants have the highest rates of singleton preterm birth.

Trends Over Time

Connecticut's preterm rate among singleton births in 2018 was 7.6% (2,517 of 33,207 births). Over the 16-year period from 2003 to 2018, annual rates fluctuated between 7.1% and 8.0%. From 2005 to 2014, the rate declined by an average of 1.0% of the previous year's rate (Fig. 1). After 2014, rates stopped decreasing and exhibited evidence of a possible increasing trend through 2018 similar to that observed nationally (Fig. 1).[9,10] Connecticut's 2018 rate was lower than the U.S. rate of 10.1% and continues its 16-year pattern of being below the U.S. annual rate (Fig.1). In 2018, Connecticut ranked 17th lowest for singleton preterm birth rate compared to all U.S. states and Washington D.C.[11]

When evaluating singleton preterm birth rates by race and ethnicity for 2003-2018, Puerto Rican, Other Hispanic, and non-Hispanic Asian rates were relatively stable. By contrast, changes in annual rates were observed for non-Hispanic White infants and non-Hispanic Black infants during the middle years of this total period, with both declining from 2005 to 2014 by an average of 1.4% and 2.2% each year compared to the previous year, respectively (Fig. 2).

Demographic Comparisons

For 2014-2018, rates of preterm birth among non-Hispanic Black (10.4%) and Puerto Rican (9.9%) singletons in Connecticut were higher than each of the other races and ethnicities (Fig. 3). Rates for Other Hispanic (7.4%) and non-Hispanic Asian (6.9%) singletons were similar with each other and both higher than non-Hispanic White (6.2%) rates. In terms of disparities, non-Hispanic Black and Puerto Rican singletons were 60-70% more likely to be born preterm and Other Hispanic singletons were 20% more likely to be born preterm than non-Hispanic White singletons (Table 1).

Health Promotion and Prevention

The national rate of preterm births among all birth pluralities, not just singletons, rose over the period 1980-2006. Major drivers behind the upward trend were increases in non-medically indicated inductions, cesarean deliveries, and use of assisted reproductive technology, such as in vitro fertilization, which often results in multiple births.[12] Starting in 2007 and ending in 2014, national rates of preterm birth declined, primarily due to reductions in the number of births to women <25, who are more likely to have preterm births as well as reduced rates of preterm birth across all maternal age groups.[13] Increases in the national preterm birth rate for both singleton and multiple births since 2014 are associated with increases in the rate of late preterm birth (36-37 weeks), rather than early preterm (<36 weeks).[10,14]

Both CDC and March of Dimes lead multiple efforts to improve birth outcomes in the U.S., including preterm birth.[15-17] For more information about preterm birth prevention in Connecticut, see *DPH Programs* (Appendix I, this report).

Figures and Tables

Figure 1: Annual Singleton Preterm Birth Rates, U.S. and Connecticut, 2003-2018

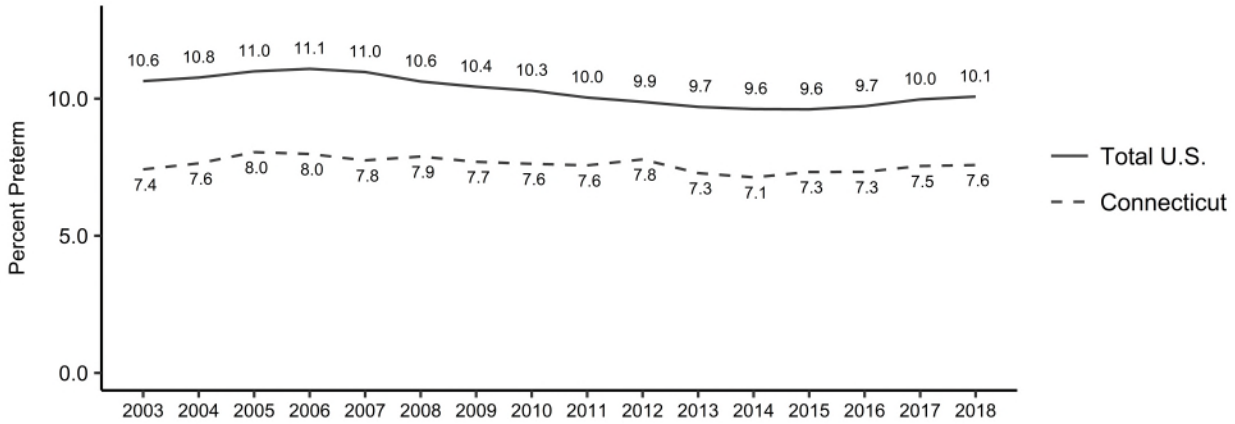


Figure 2: Annual Singleton Preterm Birth Rates by Race and Ethnicity, Connecticut, 2003-2018

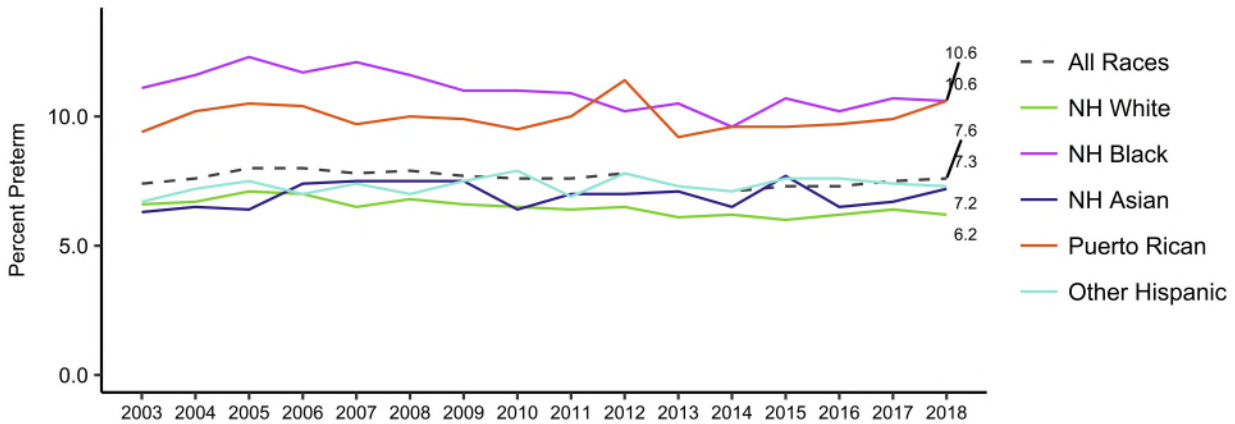


Figure 3: Singleton Preterm Birth Rates by Race and Ethnicity, Connecticut, 2014-2018

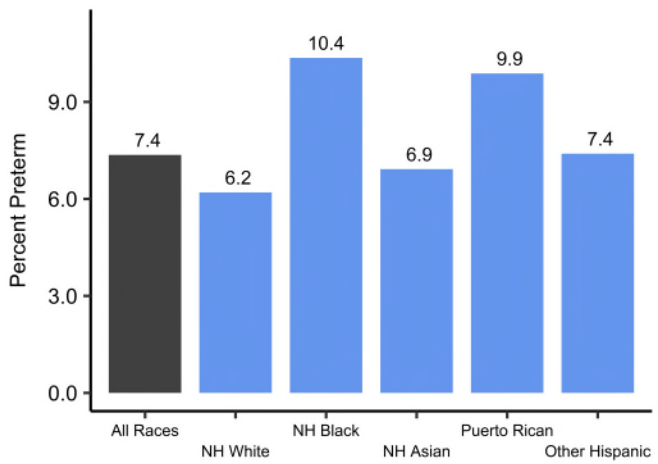


Table 1: Singleton Preterm Birth Rate Disparity Ratios by Race and Ethnicity, Connecticut, 2014-2018

Race and Ethnicity	Singleton Preterm (%)	Disparity Ratios	95% Confidence Limit‡
NH White	6.2	Ref	
NH Black	10.4	1.7*	(1.6, 1.8)
NH Asian	6.9	1.1	(1.0, 1.2)
Puerto Rican	9.9	1.6*	(1.5, 1.7)
Other Hispanic	7.4	1.2*	(1.1, 1.3)

‡Confidence intervals include adjustment for multiple comparisons using the Bonferroni method.

Singleton Low Birthweight

Infants who weigh less than 2,500 grams within 24 hours of birth are classified as low birthweight (LBW).[18] LBW at delivery results from abnormally slow growth of the fetus during pregnancy or from delivery before 37 weeks, which deprives the infant of additional time for growth. [19] Infants born LBW are likely to have breathing problems, jaundice and infections, and long-term health issues including diabetes, heart disease, high blood pressure, intellectual and developmental disabilities, and obesity.[20] LBW is a leading cause of infant mortality in the U.S.[20]

Singleton LBW refers to the percent of LBW births among single-infant deliveries only. Higher-order pregnancies (twins, triplets, etc.) are more likely to have slow fetal growth due to the shared fetal environment and have a higher risk for preterm delivery.[5] Using singleton LBW rate instead of overall LBW rate allows for tracking and evaluation of rates of LBW over time or across populations without the added complication of varying rates of higher-order pregnancies in a population over time.[5]

Key Takeaways

- The singleton LBW rate in CT showed no overall pattern of change between 2003 and 2018.
- Singleton LBW rates among NH Black infants declined on average by 0.9% each year 2003-2018 and was the only race-ethnicity group examined that showed a pattern of change during that period.
- For 2014-2018, NH Black and Puerto Rican singletons were twice as likely to be born LBW than NH White singletons.

Trends Over Time

In 2018, 5.9% of singletons born in Connecticut were LBW (1,957 of 33,207 births). From 2003 to 2018 the state LBW rate was relatively stable, with annual rates over the 16-year time-period averaging 5.8% and remaining between 5.6% and 6.1% (Fig. 1). The 2018 Connecticut singleton LBW rate was lower than the U.S. singleton rate of 6.6% and continues a 16-year history of lower rates in the state compared to the nation (Fig. 1). Unlike Connecticut's rate, for which no changes in annual rates were evident 2003-2018, the national rate was dynamic during this period, with average annual increases of 1.4% from 2003 to 2006, average annual decreases of 0.5% between 2006 and 2014, and thereafter on a upward trend of 1.6% annual increase through 2018 (Fig. 1) Connecticut ranked 18th lowest in singleton LBW rate among all U.S. states and Washington D.C. in 2018.[21]

Among the race and ethnicity groups, rates of LBW among singleton, non-Hispanic Black infants declined by 0.9% each year on average compared to the previous year over the 16-year period (Fig. 2), while rates among other race and ethnic groups showed no overall pattern of change.

Demographic Comparisons

For 2014-2018, non-Hispanic Black infants had the highest rates of singleton LBW at 9.8% of births among all major races and ethnicities, followed by Puerto Ricans (8.2%), non-Hispanic Asians (6.3%), Other Hispanics (5.2%), and non-Hispanic White infants (4.4%; Fig. 3). Analysis of disparity ratios puts non-Hispanic Black singletons and Puerto Rican singletons at double the risk for LBW compared to non-Hispanic White singletons (2.2 and 1.9, respectively; Table 1). Non-Hispanic Asian singletons and Other Hispanic singletons were also at greater risk than non-Hispanic white singletons (1.4 and 1.2, respectively; Table 1).

Health Promotion and Prevention

Current initiatives in the U.S. to reduce risk for singleton LBW center on surveillance, preconception care, and prenatal care. With respect to reducing and preventing preterm births, an ongoing transdisciplinary collaborative aims to translate research efforts into diagnostics and treatments, such as research on the synthetic form of Progesterone (17P) as a method of reducing risk of preterm birth.[22,23] Prenatal care programs seek to foster evidence-based health literacy and health equity and help address the risk factors that are critical during a pregnancy.[24] Existing surveillance efforts involve collecting and analyzing data on maternal attitudes and experiences before, during, and after pregnancy as well as data on diabetes during pregnancy in order to help improve adverse birth outcomes, such as LBW.[25,26]

For more information about prevention of LBW in Connecticut, see *DPH Programs* (Appendix I, this report).

Figures and Tables

Figure 1: Annual Singleton Low Birth Weight Rates, U.S. and Connecticut, 2003-2018

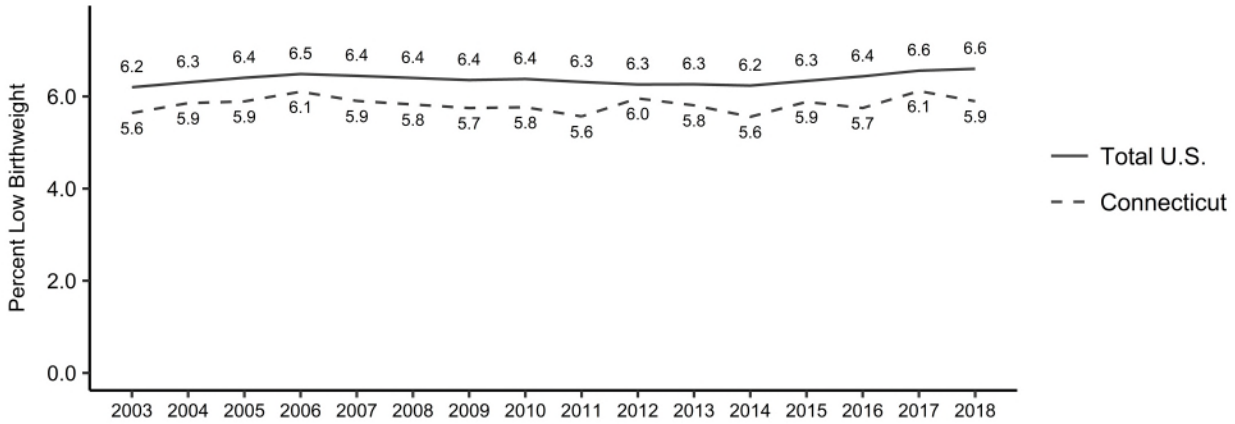


Figure 2: Annual Singleton Low Birth Weight Rates by Race and Ethnicity, Connecticut, 2003-2018

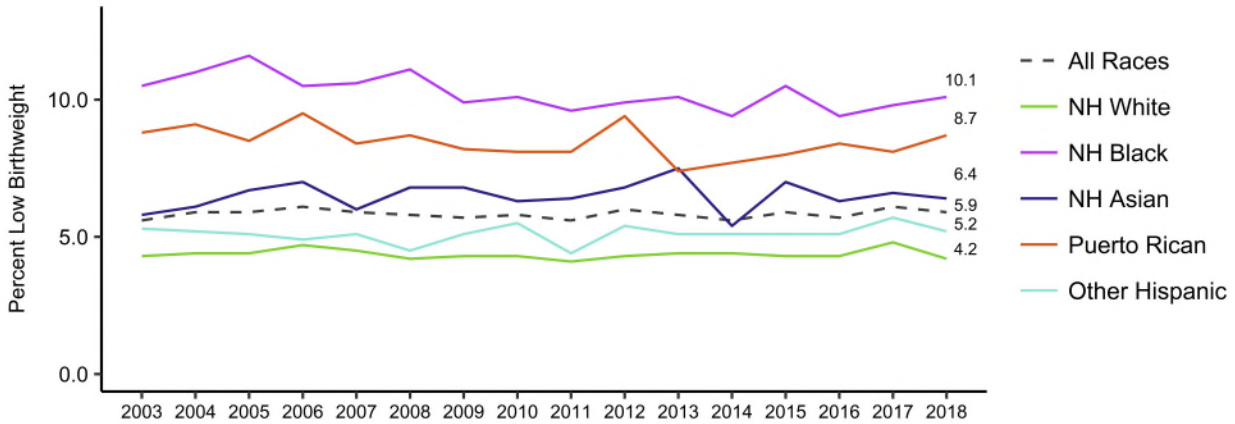


Figure 3: Singleton Low Birth Weight Rates by Race and Ethnicity, Connecticut, 2014-2018

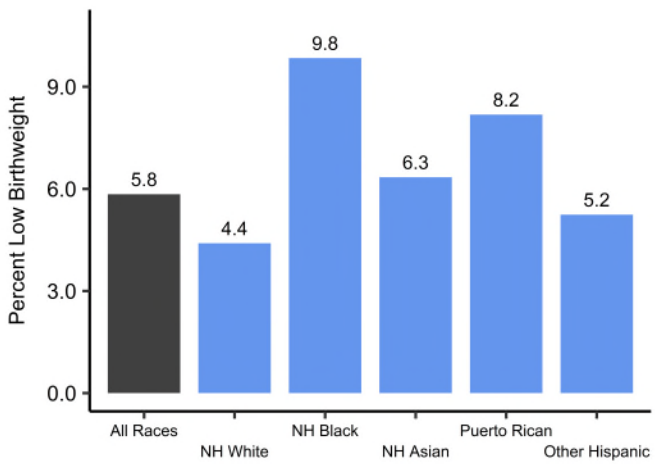


Table 1: Singleton Low Birth Weight Rate Disparity Ratios by Race and Ethnicity, Connecticut, 2014-2018

Race and Ethnicity	Singleton LBW (%)	Disparity Ratios	95% Confidence Limit‡
NH White	4.4	Ref	
NH Black	9.8	2.2*	(2.1, 2.4)
NH Asian	6.3	1.4*	(1.3, 1.6)
Puerto Rican	8.2	1.9*	(1.7, 2.0)
Other Hispanic	5.2	1.2*	(1.1, 1.3)

‡Confidence intervals include adjustment for multiple comparisons using the Bonferroni method.

Connecticut Infant Mortality

Infant deaths are deaths that occur among children less than one year of age. They are tragic losses for parents, families and societies as a whole.[27] Infant mortality refers to the overall number of infant deaths that occur in a population. It serves as a globally-accepted indicator of the overall health of a population[28] due to its association with the underlying health, poverty and socioeconomic status of that population as well as the quality of its health care system.[28] [29] Infant Mortality Rate (IMR) is the rate at which infant deaths occur in a population per 1,000 live births.[28]

Key Takeaways

- CT's annual IMR reached a new low of 4.4 in 2018 after falling at an average rate of 2.5% per year over the previous fourteen years.
- IMRs among NH White, NH Black, and Other Hispanic infants all exhibited steady declines 2005-2018 while rates among Puerto Rican infants remained statistically stable during this period.
- For 2014-2018, Puerto Rican and NH Black infants were 2 to 3 times more likely to die than NH White infants.

Trends Over Time

In 2018, Connecticut's infant mortality rate was 4.4 deaths per 1,000 births, equating to 245 infant deaths that year. The annual statewide IMR declined at an average rate of 2.5% per year between 2005 and 2018 (Fig. 1) leading to the state's lowest IMR in history in 2018. The U.S. IMR in 2018 was 5.7 deaths per 1,000 births, also a recent historical low, with the national IMR declining 2005-2018 by an average of 1.3% per year (Fig. 1). Connecticut ranked 4th lowest state in the country in 2018 for IMR and was below the Healthy People 2020 goal of 6.0 per 1,000.[3,30]

The statewide declines in IMR between 2005 and 2018 were driven by declines in several race and ethnicity groups. Non-Hispanic White, non-Hispanic Black, and Other Hispanic infant mortality rates declined over the 14-year period by 2.6%, 2.9%, and 2.5% each year on average, respectively (Fig. 2). The IMR for Puerto Rican infants across the same period showed no overall pattern of change (Figure 2).

Demographic Comparisons

For 2014-2018, mortality rates for non-Hispanic Black infants (9.9 per 1,000) and Puerto Rican infants (7.9 per 1,000) were highest among the racial-ethnic groups analyzed (Fig. 3). Rates for non-Hispanic White infants (3.3 per 1,000), non-Hispanic Asian infants (3.1 per 1,000), and Other Hispanic infants (4.4 per 1,000) were not statistically different from one another. For this 5-year period, non-Hispanic Black infants were three times more likely to die and Puerto Rican infants were two and half times more likely to die than non-Hispanic White infants (Table 1).

Health Promotion and Prevention

The national declines in infant mortality since 2005 have been attributed to declines among the five leading causes of infant death: congenital malformations, short gestation and low birthweight, sudden infant death syndrome (SIDS), maternal complications, and child injuries.[31-33] Declines in leading causes of infant death result from two general pathways: 1) reduction in the number of at-risk infants born or 2) increased survival among those at-risk infants. Overall, the majority of decline in the infant mortality rate nationally from 2000-2017 was due to improved infant survival among higher-risk maternal age groups (teens and older women) rather than reductions in birth rates among these high-risk age groups.[34] To further reduce infant mortalities in the U.S., current national initiatives support programs and policies that use evidence-based strategies, quality improvement practices for perinatal care, and collaborative learning in the following areas: safe sleep, smoking cessation, preconception and inter-conception health, social determinants of health, preterm and early term births, and risk-appropriate perinatal care.[35,36]

For more information about prevention of infant mortality in Connecticut, see *DPH Programs* (Appendix I, this report).

Figures and Tables

Figure 1: Annual Infant Mortality Rates, U.S. and Connecticut, 2005-2018

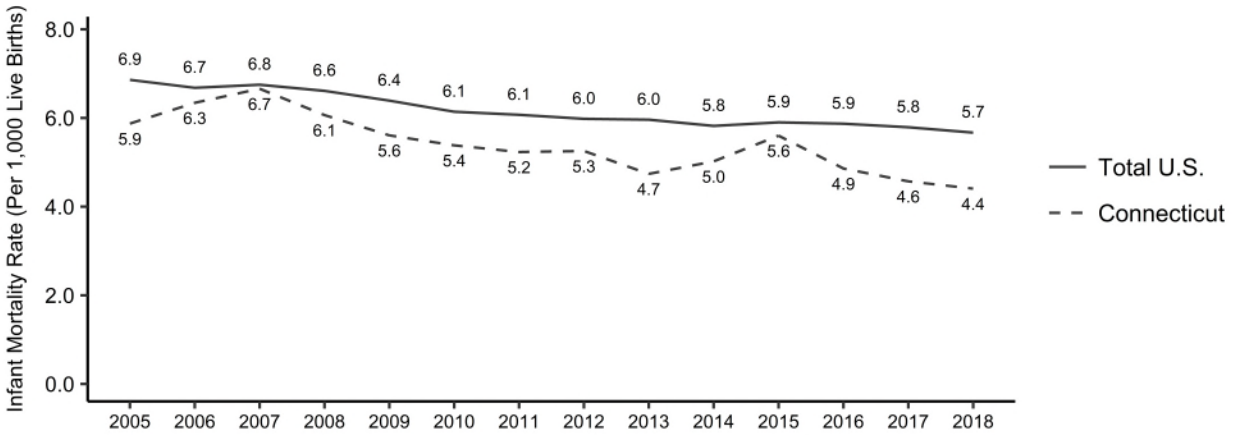


Figure 2: Annual Infant Mortality Rates by Race and Ethnicity, Connecticut, 2005-2018

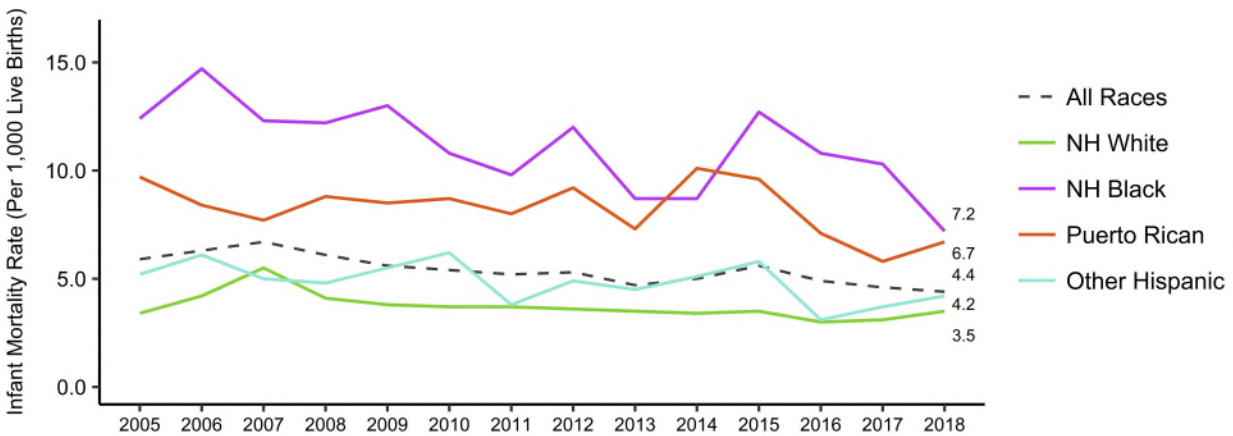


Figure 3: Infant Mortality Rates by Race and Ethnicity, Connecticut, 2014-2018

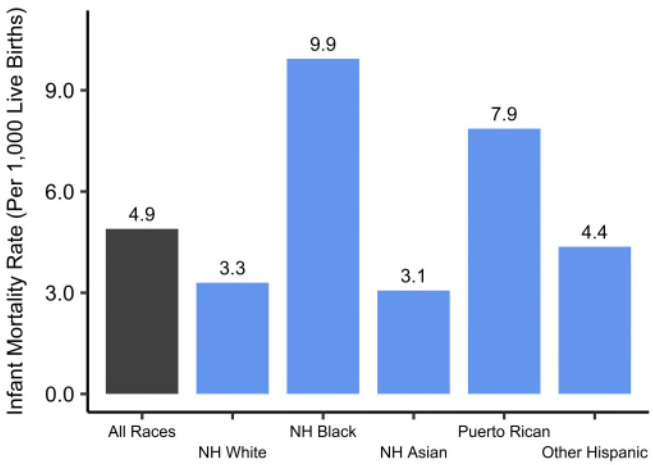


Table 1: Infant Mortality Rate Disparity Ratios by Race and Ethnicity, Connecticut, 2014-2018

Race and Ethnicity	Infant Mortality Rate	Disparity Ratios	95% Confidence Limit‡
NH White	3.3	Ref	
NH Black	9.9	3.0*	(2.4, 3.7)
NH Asian	3.1	0.9	(0.6, 1.4)
Puerto Rican	7.9	2.4*	(1.9, 3.0)
Other Hispanic	4.4	1.3	(1.0, 1.7)

‡Confidence intervals include adjustment for multiple comparisons using the Bonferroni method.

Early Prenatal Care

The health care a woman receives during her pregnancy, known as prenatal care (PNC), helps prevent pregnancy complications and promotes healthy birth outcomes.[37-39] PNC is most effective when it starts early and is regular throughout pregnancy.[40] Early initiation is important for timely management of maternal chronic conditions, such as high blood pressure and diabetes, that may influence the pregnancy, promotion of recommended daily intake of folic acid, and prevention of maternal and fetal exposures to harmful substances and medications.[39] An important indicator for public health monitoring of maternal and child health is the rate of early PNC initiation, defined as the percentage of pregnant women* who had their first PNC visit during the first trimester (3 months) of pregnancy.[5,41]

Key Takeaways

- 83.9% of pregnant women in CT initiated prenatal care in the first trimester in 2018.
- In 2016, data collection for PNC initiation changed, improving data quality but also limiting trend analyses.
- For 2016-2018, Other Hispanic and non-Hispanic Black women were least likely to receive early PNC.

Trends Over Time

In 2018, 83.9% of pregnant women living in Connecticut received early PNC. This rate was higher than the U.S. rate of 77.4% (Fig. 1) and Connecticut ranked 6th highest in the nation that year.[11]

In 2016, Connecticut adopted the 2003 Revision of the U.S. Standard Certificate of Birth which changed how the information on prenatal care initiation was collected; the certificate now collects 'date of first PNC visit' rather than 'month of pregnancy during which PNC began.[41] The date of first PNC visit collected on the 2003 Revision has been shown to have substantial agreement with the date recorded in medical records[42] and allows for direct calculation on gestational age at PNC initiation and classification into early (first 13 weeks of pregnancy) or late (after 26 weeks) initiation.[41]

Due to changes in methodology, rates for 2015 and earlier are not directly comparable to rates for 2016 and later.[41,43] For 2003-2015, early PNC rates fluctuated between 85.8% and 88.6% with no pattern of increase or decrease. For 2016-2018, the rate of early PNC initiation ranged from 83.9% to 84.3%. The extent to which the shift in rates between 2015 and 2016 of 4.2 percentage points is due to a true change in the timing of PNC initiation by pregnant women versus an artificial effect due to the methodology change has not been assessed, which limits interpretation.

National rates for early PNC have been based on the 'date of first PNC visit' since 2016.[44] As such, U.S. rates are provided only for the years 2016-2018 for which the state and national metrics are the same.

Demographic Comparisons

For 2016-2018, the state rate of early PNC initiation was 84.1% (Fig. 3) but rates varied by race and ethnicity. The highest rate of early PNC was among non-Hispanic White women (88.3%) followed by non-Hispanic Asian and Puerto Rican women (83.5% and 83.1%, respectively) who had similar rates. Non-Hispanic Black women (77.4%) were lower than these previous race and ethnicity groups while Other Hispanic women (75.6%) had the lowest early PNC rates of all (Fig. 3). Disparities as compared with NH White women were present for all four non-White groups with the greatest effects occurring in Other Hispanic and non-Hispanic Black women who were 14% and 12%, respectively, less likely to initiate PNC in the first trimester (Table 1).

Health Promotion and Prevention

Delayed initiation of prenatal care has been historically associated with lack of knowledge by the mother that she was pregnant and financial limitations for seeking prenatal care.[45] These drivers of delayed initiation have led public health initiatives to expand access to prenatal care and family planning services, particularly for women of low income.

[43,45] Expansions of insurance under the Affordable Care Act and state Medicaid programs have contributed to increases in early prenatal care initiation throughout the U.S.[46-48] For more information about promotion of early PNC in Connecticut, see *DPH Programs* (Appendix I, this report).

*Pregnant women for which this indicator is calculated includes only those for whom pregnancy resulted in delivery of a live birth.

Figures and Tables

Figure 1: Annual Rates of Early Prenatal Care, U.S. and Connecticut, 2003-2018

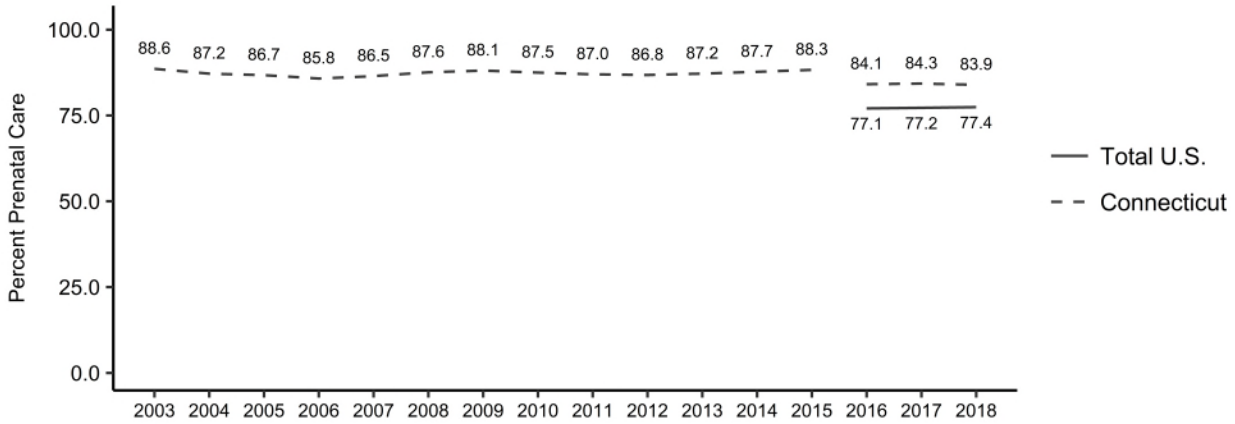


Figure 2: Annual Rates of Early Prenatal Care by Race and Ethnicity, Connecticut, 2003-2018

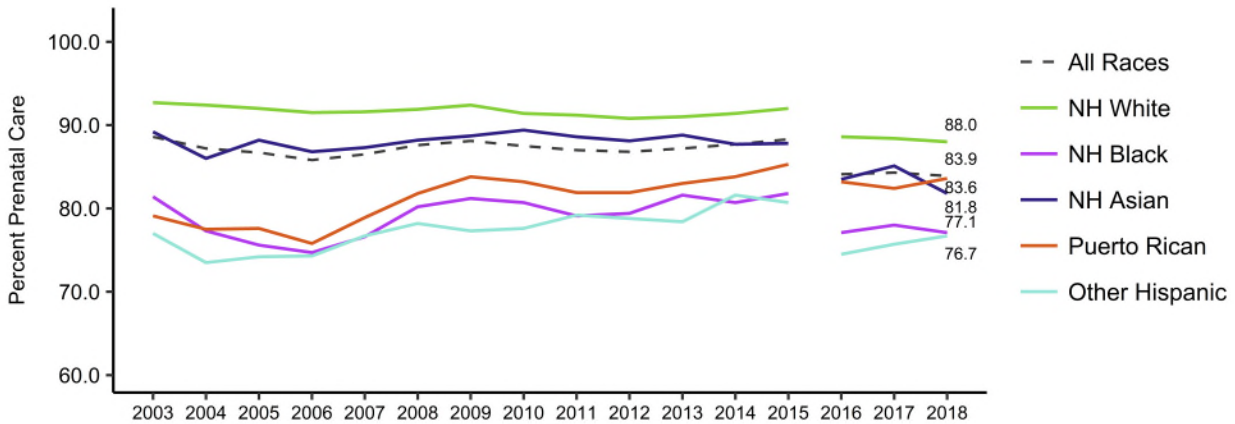


Figure 3: Early Prenatal Care Rates by Race and Ethnicity, Connecticut, 2016-2018

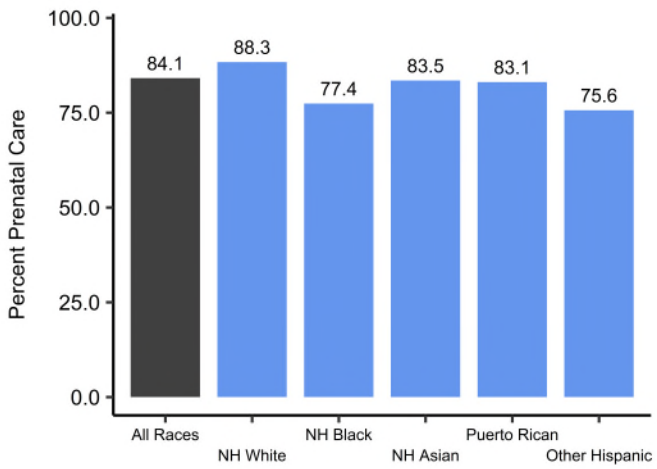


Table 1: Early Prenatal Care Rate Disparity Ratios by Race and Ethnicity, Connecticut, 2016-2018

Race and Ethnicity	Early Prenatal Care (%)	Disparity Ratios	95% Confidence Limit‡
NH White	88.3	Ref	
NH Black	77.4	0.88*	(0.85, 0.9)
NH Asian	83.5	0.94*	(0.91, 0.98)
Puerto Rican	83.1	0.94*	(0.91, 0.97)
Other Hispanic	75.6	0.86*	(0.83, 0.88)

‡Confidence intervals include adjustment for multiple comparisons using the Bonferroni method.

Teen Births

Teen birth rate is the number of live births to women aged 15-19 per 1,000 females aged 15-19.[5] It is an important public health indicator because births to teenage mothers pose major social and economic challenges. Teen mothers are more likely to drop out of high school, have poor prenatal care, reduced employment opportunities, use public assistance and live in poverty, and experience substance abuse, partner violence, and depression compared to older mothers.[49,50] Additionally, children born to teenage mothers are at a higher risk of being born preterm and with low birth weight, having academic and behavioral problems, initiating sexual activity early and becoming teen parents themselves, imprisonment, and having lower earnings.[51-54]

Key Takeaways

- CT's teen birth rate reached a historic low in 2018 at 8.3 per 1,000 which continues its 16-year pattern of decline.
- Teen birth rates declined among all race and ethnicity groups analyzed between 2003 and 2018.
- Despite declines, for 2014-2018, Hispanic women were 8 times and NH Black women were nearly 5 times more likely to have a teen birth than NH White women.

Trends Over Time

In 2018, Connecticut's teen birth rate was 8.3 births per 1,000 females aged 15-19 and marks the thirteenth year in a row that the state rate reached its lowest level (Fig. 1). Between 2003 and 2018, the teen birth rate showed a consistent downward trend with a total decline of 66%. While the rate of decline was initially modest (averaged 1.2% per year), it fell sharply between 2008 and 2015 at 10.8% compared to the previous year and continued at an average annual decline of 7.3% from 2015-2018. The 7-year decline from 2008-2015 accounted for a 56% reduction in the state rate of teens births over that period.

The U.S. teen birth rate was 17.4 births per 1,000 females aged 15-19 in 2018. Declining teen birth rates in Connecticut are consistent with patterns of decline across the U.S., yet rates in Connecticut were consistently lower than U.S. rates (Fig. 1).[55,56] Connecticut ranked 3rd lowest among 50 states and the District of Columbia in 2018 for teen birth rates and remains well below the Healthy People 2020 national targets for ages 15-17 (36.2 per 1,000 females 15-17 years) and 18-19 (104.6 per 1,000 females 18-19 years).[21,30]

Between 2003 and 2018, declines in teen birth rates were evident among all major races and ethnicities in the state, but the patterns of change varied (Fig. 2). For non-Hispanic white women, the existing rate of decline of 5% per year on average from 2003 to 2009 shifted to 12% per year for 2009 to 2018. Among Hispanic and non-Hispanic black women, initial rates of decline were more modest at about 2% per year on average but shifted to about 13% annually beginning in 2008 and then tapered in the most recent 4-5 years (6.9% and 4.6%, respectively). For non-Hispanic Asian women, the rate of decline was steady averaging 10.8% per year from 2003-2018.

Demographic Comparisons

Despite the substantial reduction in teen births in Connecticut, racial and ethnic disparities remain prominent. For 2014-2018, rates among the race-ethnicity groups analyzed each differed from one another. Teen birth rates for Hispanic women were highest (27.2 per 1,000), followed by non-Hispanic Black women (15.9 per 1,000), followed by non-Hispanic White women (3.3 per 1,000), then non-Hispanic Asian women with the lowest rate (1.8 per 1,000; Fig. 3). During this five-year period, Hispanic women were eight times more likely and non-Hispanic Black women were nearly 5 times more likely to give birth as a teenager than non-Hispanic White women (Table 1). In contrast, non-Hispanic Asian women had less than half of the risk of a teen birth compared to non-Hispanic White women.

Health Promotion and Prevention

National declines in teen birth rates are attributed to increased abstinence among females aged 15-19, increased and more effective (dual method) contraceptive use, expansion of pregnancy prevention programs targeting teens, economic trends and government policies.[57-61] Current initiatives for preventing teen pregnancy seek to improve quality of and enhance capacity and accessibility for reproductive health services in community health centers, especially among teens deemed most vulnerable such as those in foster care, juvenile justice and probation, or housing developments.[62-64] Evidence-based interventions are even engaging young men to address and reduce the risk of teen pregnancies and premature fatherhood.[65]

For more information about health promotion and prevention activities in Connecticut, visit the Resources page.

Figures and Tables

Figure 1: Annual Teen Birth Rates, U.S. and Connecticut, 2003-2018

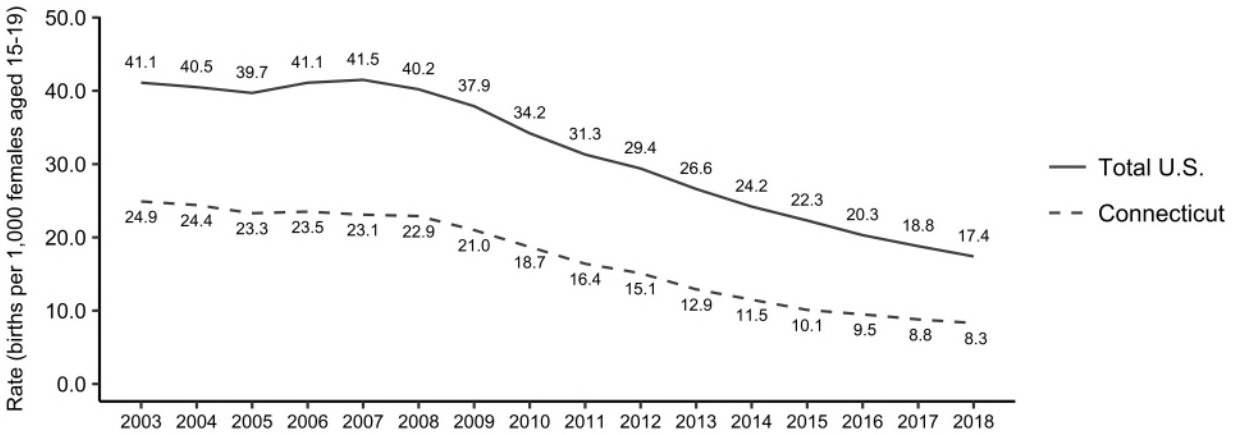


Figure 2: Annual Teen Birth Rates by Race and Ethnicity, Connecticut, 2003-2018

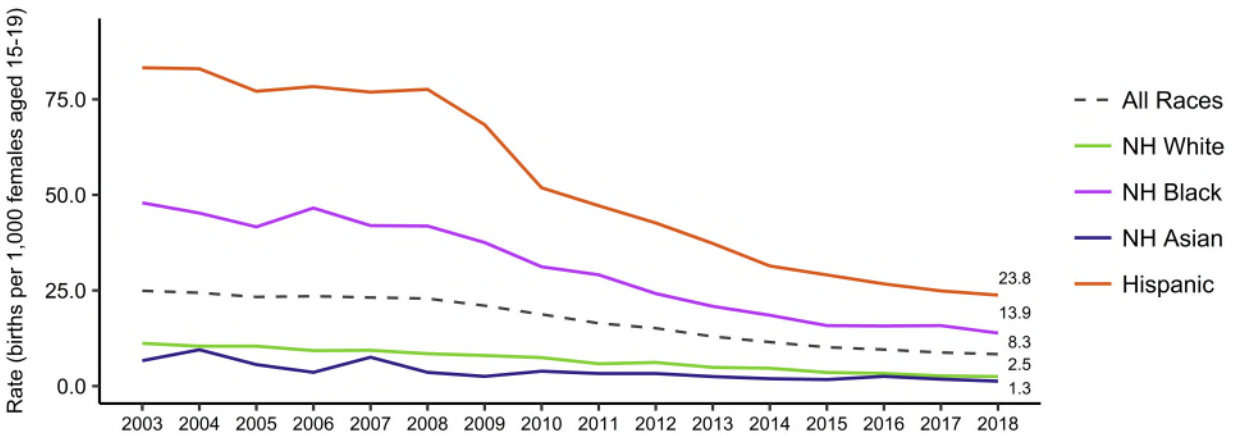


Figure 3: Teen Birth Rates by Race and Ethnicity, Connecticut, 2014-2018

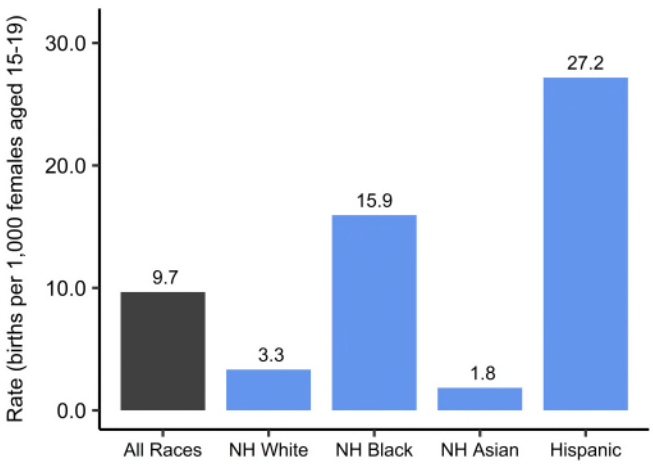


Table 1: Teen Birth Rate Disparity Ratios by Race and Ethnicity, Connecticut, 2014-2018

Race and Ethnicity	Teen Birth Rate	Disparity Ratios	95% Confidence Limit[‡]
NH White	3.3	Ref	
NH Black	15.9	4.8*	(4.4, 5.3)
NH Asian	1.8	0.6*	(0.4, 0.8)
Hispanic	27.2	8.2*	(7.6, 8.9)

[‡]Confidence intervals include adjustment for multiple comparisons using the Bonferroni method.

General Fertility Rate

Birth rate and general fertility rate (GFR) are two common metrics for fertility. Birth rate calculates the rate of births among an entire population including those who are not fertile, such as men, children, and older women. General fertility rate (GFR) calculates the rate of births among only those persons in a population who are potentially fertile (women ages 15-44 years). As such, GFR, defined as the number of live births per 1,000 women of childbearing age (15-44 years),[27,66] is a more robust indicator of fertility than birth rate as it allows for meaningful comparisons of fertility between populations or time periods that may have differing age structures.[27] Fertility rates, alongside mortality rates, are important indicators of population growth and societal change.[27,67]

Key Takeaways

- The GFR in CT declined from 2003 to 2018 with the most rapid decline occurring from 2007 to 2011.
- While NH White and NH Asian rates steadily declined between 2003 and 2018, fertility trends among NH Black and Hispanic women shifted twice over the same period.
- For 2014-2018, Hispanic women continue to have the highest GFR among the major race-ethnicity groups.

Trends Over Time

In 2018, Connecticut's GFR was 51.5 births per 1,000 females aged 15 to 44. The 2018 rate was 13% lower than the 2003 state rate of 59.6 per 1,000. During the sixteen-year period, Connecticut's GFR was initially stable (2003-2007), then declined rapidly (averaged 2.4% per year during 2007-2014), and then continued to decline but at a slower rate (averaged 0.5% per year for 2014-2018; Figure 1). The total effect of varying trends during this 16-year period was an average decline of 0.9% per year.

For 2018, Connecticut's GFR of 51.5 per 1,000 was lower than U.S.' rate of 59.1 per 1,000 (Figure 1); both rates were historic lows.[5] Over the 2003-2018 period, national rates increased initially (averaged 1.4% per year, 2003-2007), and then began to fall thereafter with steady declines of 0.9% per year on average observed for 2010-2018 (Fig. 1). Connecticut ranked 7th lowest among all U.S. states and Washington D.C in 2018, part of a pattern of low GFRs for Northeastern states.[11,27]

Patterns of change in annual GFRs in Connecticut varied over time for each racial and ethnic group (Fig. 2). Hispanic GFRs declined steeply from 2008 to 2012 at 7.5% per year on average. GFRs among non-Hispanic Black women declined by 2.6% per year on average from 2007 to 2014. Rates for non-Hispanic Asian women had an overall decline for the whole period at an average of 2.2% per year while GFRs among non-Hispanic White women declined from 2003 to 2009 at a rate of 1.8% per year on average.

Demographic Comparisons

For 2014-2018, GFRs differed among all races and ethnicities analyzed in Connecticut (Fig. 3). Hispanic populations had the highest rates (63.5 per 1,000), followed by non-Hispanic Asians (57.9 per 1,000), and then non-Hispanic Blacks (53.6 per 1,000). Non-Hispanic White populations had the lowest rates (47.0 per 1,000). Disparity ratios were not evaluated for this indicator.

Health Promotion and Prevention

In the U.S., increased access to contraception, higher educational attainment, and greater participation in the workforce among women are associated with long-term declines in fertility rates.[67,68] Economic recessions also impact fertility rates, although on shorter time scales, and the Great Recession during 2007-2009 resulted in immediate declines in fertility rates in the U.S.[69,70] Declining fertility is a major driver of slowed population growth, which has positive benefits on the environment, food production, and greenhouse gas emissions but also has negative impacts for economies, labor, and social support systems.[71] Changes to the age structure of populations towards older median ages due to declining fertility can also pose challenges for financing and provision of health care, particularly long-term care.[72]

Figures and Tables

Figure 1: Annual General Fertility Rates, U.S. and Connecticut, 2003-2018

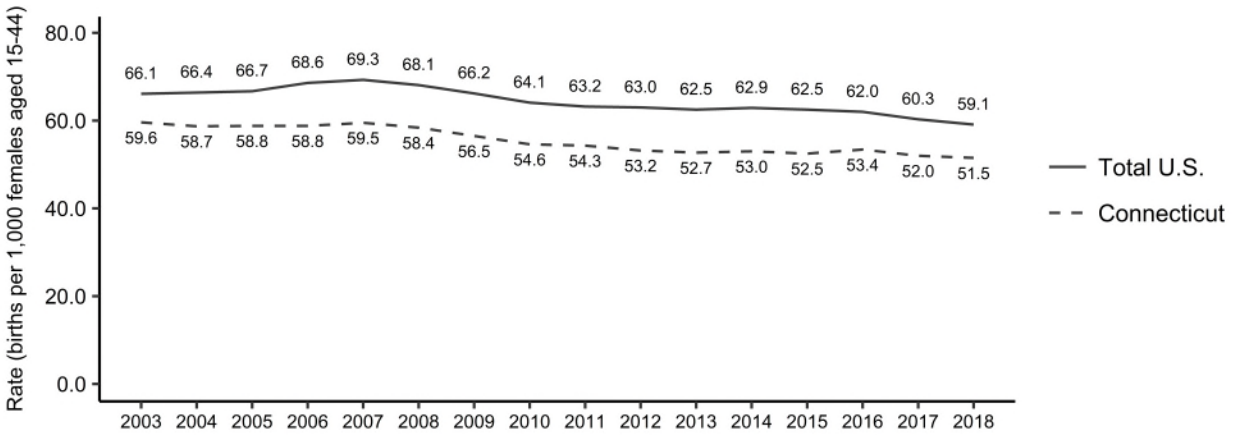


Figure 2: Annual General Fertility Rates by Race and Ethnicity, Connecticut, 2003-2018

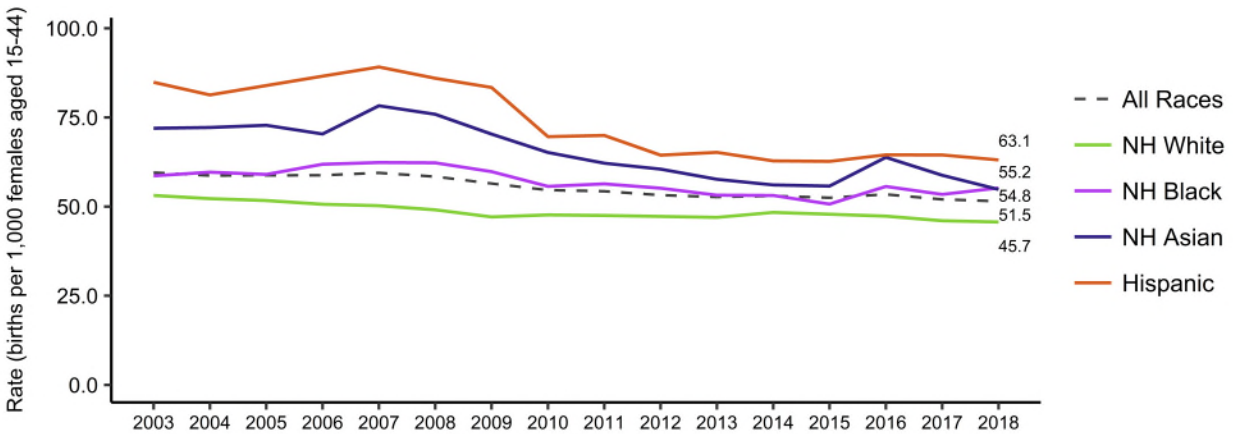
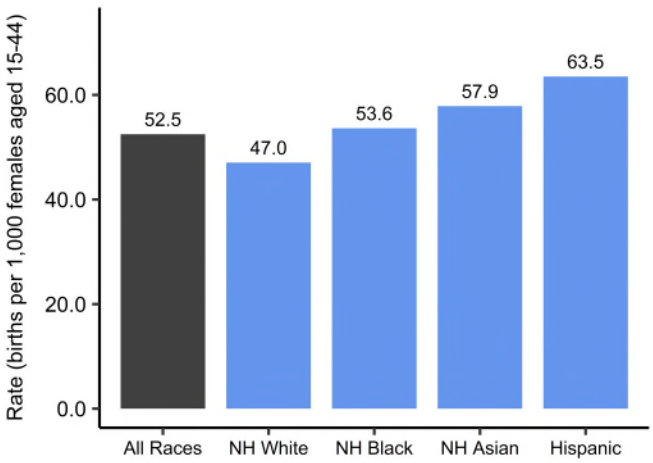


Figure 3: General Fertility Rates by Race and Ethnicity, Connecticut, 2014-2018



Appendices

APPENDIX I
CONNECTICUT MATERNAL and CHILD HEALTH RESOURCES

DPH Maternal and Child Health Unit leads a variety of programs to improve maternal and child health throughout the state. These programs target reducing rates of poor birth outcomes and associated social, racial, and economic disparities amongst the populations we serve.

Fatherhood Initiative

The *Connecticut Fatherhood Initiative (CFI)* is a broad-based, statewide collaborative effort led by the Department of Social Services, focused on chancing the systems that can improve fathers' ability to be fully and positively involved in the lives of their children. The Fatherhood Initiative legislation was passed with bipartisan support in the fall of 1999, after state and local leaders continued to see children who had been affected by father-absence. Over the past several years, fatherhood programming has been funded in multiple ways: legislative appropriations, federal grants and through the Department of Social Services' budget.

Personal Responsibility Education program (PREP)

Through the State Personal Responsibility Education Program (PREP), Family and Youth Services Bureau awards grants to State agencies to educate young people on both abstinence and contraception to prevent pregnancy and sexually transmitted infections, including HIV/AIDs. The program targets youth ages 10-19 who are homeless, in foster care, live in rural areas or in geographic areas with high teem birth rates, or come from racial or ethnic minority groups. The program also supports pregnant and parenting youth. State PREP projects must educate young people in at least three of the following six congressionally mandated subject areas: healthy relationships, adolescent development, financial literacy, parent-child communication, educational and career success, and healthy life skills.

Pregnancy Case Management

The *Pregnancy Case Management* program focuses on pregnant females and teens under the age of 20 who are at greatest risk for poor birth outcomes. This is a coordinated, culturally sensitive approach to providing individualized client services through intensive case management and home visitation. The services focus on building social supports, providing education, promoting birth spacing and family planning, and providing referrals to ongoing medical care.

Healthy Choices for Women and Children

Healthy Choices for Women and Children is designed to address the multiple health and social needs of pregnant and postpartum women (and their families), who use or are at risk of using substances; and reside in the City of Waterbury. The program includes a comprehensive team approach and home visiting to provide linkage to needed services and supports to this population of women and children.

Family Wellness Healthy Start

The Family Wellness Healthy Start program is funded by the Health Resources and Services administration through the Connecticut Department of Public Health to reduce infant mortality and

poor birth outcomes in the cities of Hartford and New Britain. The goal of the program is to serve low income pregnant and parenting women who live in Hartford and New Britain until their child reaches 18 months. Services are provided to increase the number of low income, Black/African American and Hispanic pregnant women who enter prenatal care early and receive adequate prenatal care services to reduce infant and maternal mortality.

School-based Health Centers

SBHCs are comprehensive primary care facilities located in or on the grounds of schools. They are licensed by DPH as outpatient or hospital satellite clinics. SBHCs assure that student, particularly those that are uninsured and under insured, have access to comprehensive health and preventative services needed to be healthy, in school, and ready to learn. SBHCs help schools do their job of educating by improving the health and well-being of students and addressing the health issues that interfere with learning.

Young Adult Services

YAS is developed to help young adults transition successfully from the Dept. of Children & Families to the adult mental health system and to achieve the necessary skills for adulthood. The mission is to improve the lives of young people by providing the highest quality services possible. This is done by forming a partnership with the individual, their family, identified significant persons, and with other community service providers. In order to be considered by Young Adult Services, an individual must be between the ages of 18 and 25 and often have a history of DCF involvement. They must also have a history of a major mental health problem.

MotherToBaby Connecticut

The *MotherToBaby* program is a state and federally funded program for Connecticut residents or women who have Connecticut health care providers. The program provides free, confidential, up-to-date information on exposures prior to and during pregnancy and breastfeeding. Pregnant or breastfeeding women and their partners, those planning a pregnancy, individuals considering adoption and have questions about birth mom's exposures or health care providers are among the groups who are encouraged to contact this service.

Pregnancy Risk Assessment Monitoring System (PRAMS)

Connecticut PRAMS, the Pregnancy Risk Assessment Monitoring System, is a surveillance project of the Connecticut Department of Public Health and the federal Centers for Disease Control and Prevention (CDC). PRAMS collects information on maternal attitudes and experiences before, during, and shortly after pregnancy from a sample of postpartum women in Connecticut. Information from PRAMS will be used to help plan better health programs for Connecticut mothers and infants.

MCH Title V Block Grant

As one of the largest federal block grant programs, Title V funding is a key source of support for promoting and improving the health and well-being of the nation's mothers, children-including children with special needs, and their families. The funds seek to create federal and state partnerships that support a variety of opportunities, including: Access to quality health care for mothers and children, health promotion efforts that seek to reduce infant mortality and the incidence of preventable diseases,

access to comprehensive prenatal and postnatal care for women, an increase in health assessments and follow-up diagnostic and treatment services, access to preventive and child care services as well as rehabilitative services for children in need of specialized medical services, among other services.

Women, Infants & Children

The WIC program is a federal grant program that works to ensure healthy pregnancies and birth outcomes, and the adequate growth and development of women, infants, and children up to age 5 who are at nutritional risk. Some of the benefits of the program include improvement in pregnancy outcomes, reduction in hospitalization and Medicaid costs, assisting children's development readiness for kindergarten, increase in food security for low-income families, and increase in local availability for healthy foods and fruits.

Maternal Mortality Review Program

In June 2018, state legislation passed, granting statutory authority to conduct a comprehensive, multidisciplinary review of maternal deaths for purposes of identifying factors associated with maternal death and making recommendations to reduce maternal deaths. The MMRC examines all deaths, identifies whether they are either a pregnancy-associated death, a pregnancy-related death or if there is not enough information to determine. Factors that contribute to pregnancy-related deaths include access to care, missed or delayed diagnoses, and not recognizing warning signs.

AIM Initiative

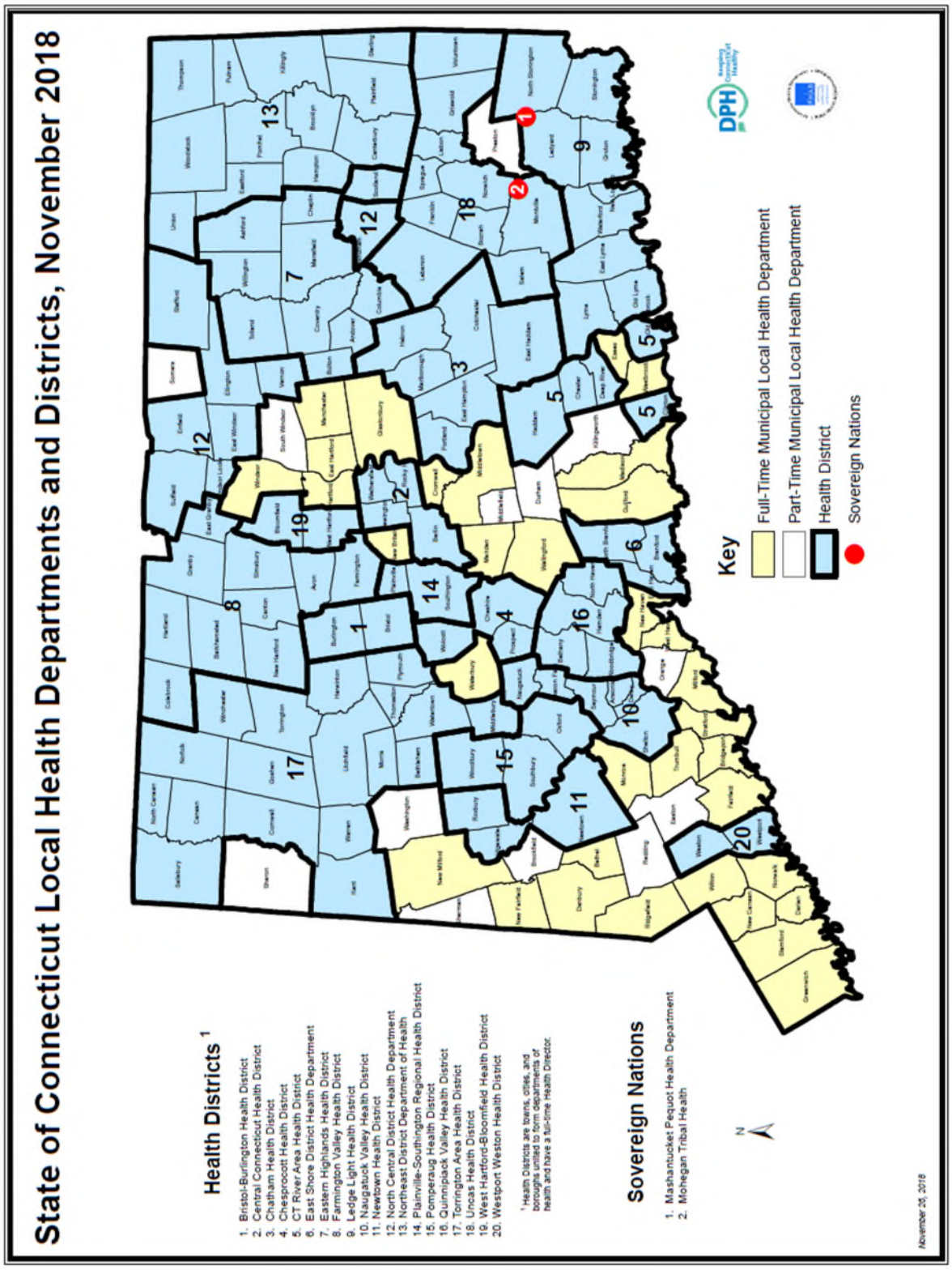
The Alliance for Innovation on Maternal Health (AIM) is a national data-driven maternal safety and quality improvement initiative. Based on proven safety and quality implementation strategies, AIM works to reduce preventable maternal mortality and severe morbidity across the U.S. AIM is funded through a cooperative agreement with the Maternal and Child Health Bureau (MCHB)-Health Resource Services administration through August 2023.

CT Breastfeeding Program (CBC)

Connecticut Breastfeeding Coalition (CBC) advocates for access to comprehensive, current, and culturally appropriate lactation care and service for all women, children and families in Connecticut. The Coalition works to ensure that breastfeeding is recognized as the normal and preferred method of feeding infants and young children, to ensure that all federal, state and local laws recognize and support the importance and practice of breastfeeding, and to increase protection, promotion and support for breastfeeding mothers in the workforce. The Coalition meets monthly at different locations in Connecticut.

APPENDIX II
HEALTH DISTRICT CONSTITUENT TOWNS

Health District	District Number	Constituent Towns
Bristol-Burlington	1	Bristol, Burlington
Connecticut River Are	2	Clinton, Old Saybrook, Deep River, Haddam, Chester
Central Connecticut	3	Berlin, Newington, Rocky Hill, Wethersfield
Chatham	4	Colchester, Hebron, Marlborough, Portland
Chesprocott	5	Cheshire, Prospect, Wolcott
East Shore	6	Branford, East Haven, North Branford
Eastern Highlands	7	Andover, Ashford, Bolton, Chaplin, Columbia, Coventry, Mansfield, Scotland, Tolland, Willington
Farmington Valley	8	Avon, Barkhamsted, Canton, Colebrook, East Granby, Farmington, Granby, Hartland, New Hartford, Simsbury
Ledge Light	9	East Lyme, Old Lyme, Groton, Ledyard, New London, Waterford, Stonington, North Stonington
Naugatuck Valley	10	Ansonia, Beacon Falls, Derby, Naugatuck, Seymour, Shelton
Newtown	11	Bridgewater, Newtown, Roxbury
North Central	12	East Windsor, Ellington, Enfield, Stafford, Suffield, Vernon, Windsor Locks, Windham
Northeast	13	Brooklyn, Canterbury, Eastford, Hampton, Killingly, Plainfield, Pomfret, Putnam, Sterling, Thompson, Union, Woodstock
Plainville-Southington Regional	14	Plainville, Southington
Pomperaug	15	Oxford, Southbury, Woodbury
Quinnipiack Valley	16	Hamden, North Haven, Woodbridge, Bethany
Torrington Area	17	Bethlehem, Cornwall, Goshen, Harwinton, Kent, Litchfield, Bantam, Litchfield, Morris, Norfolk, North Canaan, Plymouth, Salisbury, Thomaston, Torrington, Warren, Watertown, Winchester, Canaan, Middlebury
Uncas	19	Bozrah, Griswold, Lisbon, Jewett City, Lebanon, Montville, Norwich, Sprague, Salem, Voluntown, Franklin
West Hartford-Bloomfield	20	Bloomfield, West Hartford
Westport/Weston	21	Weston, Westport


State of Connecticut Local Health Departments and Districts, November 2018
Health Districts [1]
1. Bristol-Burlington Health District
2. Central Connecticut Health District
3. Chatham Health District
4. Chesprocott Health District
5. CT River Area Health District
6. East Shore District Health Department
7. Eastern Highlands Health District
8. Farmington Valley Health District
9. Ledge Light Health District
10. Naugatuck Valley Health District
11. Newtown Health District
12. North Central District Health Department
13. Northeast District Department of Health
14. Plainville-Southington Regional Health District
15. Pomperaug Health District
16. Quinnipiack Valley Health District
17. Torrington Area Health District
18. Uncas Health District
19. West Hartford-Bloomfield Health District
20. Westport Weston Health District
[1] Health Districts are towns, cities, and boroughs united to form departments of health and have a full-time Health Director.
Sovereign Nations
1. Mashantucket Pequot Health Department
2. Mohegan Tribal Health
N
Key
Full-Time Municipal Local Health Department
Part-Time Municipal Local Health Department
Health District
Sovereign Nations
November 26, 2018

APPENDIX III
GLOSSARY and RATE DEFINITIONS

While consistent with general public health definitions, some terms and rates defined here are specific for Connecticut's reporting.

BIRTH RATE – Number of live births occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population of the given geographical area during the same year. For fertility rates, see FERTILITY. *Note that live birth rates do not include all pregnancies. Fetal deaths, induced terminations, and early miscarriages are not included.*

- Crude birth rate - The crude birth rate is the number of live births occurring among the population of a given geographical area during a given year, per 1,000 mid-year total population of the given geographical area during the same year.

$$\left(\frac{\text{Number of resident live births}}{\text{Total resident population}} \right) \times 1{,}000$$

- Age-specific birth rate - The number of live births to women in a specific age group per 1,000 females in the population in the same age group.

$$\left(\frac{\text{Number of resident live births in age group}}{\text{Total resident population in age group}} \right) \times 1{,}000$$

BIRTH INTERVAL - Elapsed time between a mother's deliveries.

- Birth-to-Conception Interval (BTC) - Time interval between the delivery of the last live birth the delivery of the current live birth.
- Inter-pregnancy Interval (IPI) – Time interval between the delivery of the last pregnancy outcome (live birth, still birth, miscarriage) and the conception (based on date of last menstrual period) of the current pregnancy. The value of the inter-pregnancy interval calculation is that it avoids confounding by length of the subsequent pregnancy.

BIRTH WEIGHT - Weight of the baby (live born or stillborn) at delivery, usually measured during the first hour of life.

- Low birth weight (LBW) - Birth weight of less than 2,500 grams (approximately 5 lbs., 8 oz.).
- Low Birthweight Rate – The number of live births weighing less than 2,500 grams among of all live births in a given year multiplied by 100.

$$\left(\frac{\text{Number of live births weighing less than 2,500 g}}{\text{Number of live births}} \right) \times 100$$

- Very low birth weight (VLBW) - Birth weight of less than 1,500 grams (approx. 3 lbs., 5 oz.).

BODY MASS INDEX (BMI) - A person's weight in kilograms divided by the square of height in meters. A high BMI can be an indicator of high body fatness.

BREASTFED - Infants reported as having received breastmilk or colostrum from the mother prior to discharge (at any time between delivery and discharge).

CAUSE OF DEATH – Causes of death refers to all diseases, morbid conditions, or injuries that either resulted in or contributed to death, and the circumstances of the accident or violence that produced any such injuries. Symptoms or modes of dying, such as heart failure or asthenia, are not considered to be causes of death for statistical purposes. Classification of cause is determined based on the international rules and sequential procedure set forth by the National Center for Health Statistics and the World Health Organization (International Classification of Disease, Tenth Revision).

- Underlying cause - The disease or injury which initiated the train of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury. Sometimes referred to as primary or principal cause. The underlying cause of death is the one to be adopted as the cause for tabulation of mortality statistics.

- Contributory cause - A significant condition that unfavorably influences the course of the morbid process and thus contributes to the fatal outcome, but which is not related to the disease or condition directly causing death.

- Multiple causes – All causes of death including not only the underlying cause but also immediate cause of death and all other intermediate and contributory conditions entered by the certifying physician.

- ICD-10 – International Classification of Disease, Tenth Revision

CERTIFIER OF CAUSE OF DEATH - A certifier of cause of death is a person authorized by law (the physician who attended the deceased in his/her last illness; or the coroner for deaths of persons who were not attended during the last illness by a physician, or for unnatural deaths due to violence or accident) who issues a certificate, on the prescribed form, stating to the best of his/her knowledge and belief, the cause of death and other facts related to the event for submission to the local registrar.

CERTIFIED NURSE MIDWIFE (CNM) - a registered nurse with additional training as a midwife who delivers infants and provides prenatal and postpartum care, newborn care, and some routine care (such as gynecological exams) of women.

CESAREAN DELIVERY - A cesarean section, sometimes called c-section, is a surgical procedure in which incisions are made through a woman's abdomen and uterus to deliver her baby.

- Primary Cesarean Delivery – Cesarean delivery by a woman who has not had a previous cesarean delivery.

- Repeat Cesarean Delivery – Cesarean delivery by a woman who has had a previous cesarean delivery.

- Vaginal Birth After Cesarean (VBAC) – Vaginal delivery by a woman who has had a previous cesarean delivery.

- Trial of Labor - Permitting labor to continue long enough to assess a woman's chances of a successful vaginal birth.

- Low Risk Cesarean Delivery - Cesarean delivery among term (37 or more completed weeks), singleton (one fetus), vertex (headfirst) births to women giving birth for the first time.

DEATH RATE - The number of deaths in a given period divided by the population exposed to risk of death in that period. Typically, rates are expressed annually using the population at the mid-year.

- Crude Mortality Rate (CMR) – Also known as the Crude Death Rate, it is the number of deaths per 100,000 population in a given year. The death rate is called “crude” as it does not include any adjustments for demographics or other factors. This rate should not be used for making comparisons between different populations when the age, race, and sex distributions of the populations are different.

- Age-specific mortality rate (ASR) - The number of deaths in a specific age group per 100,000 population in the same age group. Rates for persons under 1 year of age are an exception for which rates are calculated per 1,000 live births.

- Age-adjusted mortality rate (AAMR) - A value which indicates the risk of dying relative to a standard population. Age-adjusted rates are computed by applying age-specific rates in a population of interest to a standardized age distribution to eliminate differences in observed rates that result from age differences in population composition. Since the effect of age has been removed, these rates are called "age-adjusted" rates. It is important to remember that crude and age-specific rates are the actual rates of death or disease in the population while age-adjusted rates are only useful for comparisons to other populations.

EDUCATIONAL ATTAINMENT – The highest degree or level of school completed at the time of the event.

ETHNICITY - See “Hispanic/Latino ethnicity.”

FERTILITY – The ability for an individual to reproduce through normal sexual activity.

- Total Fertility Rate - Estimation of the number of births that a hypothetical group of 1,000 women would have over their lifetimes based on age-specific birth rates in a given year.

$$\left(\frac{\text{Sum of age specific fertility rates} * (\text{age interval of women})}{1{,}000} \right)$$

- General Fertility Rate – The number of live births per 1,000 women aged 15-44 in a given year.

$$\left(\frac{\text{Number of resident live births}}{\text{Female population (Ages } 15-44)} \right) \times 1{,}000$$

- Age-specific Fertility Rate – The number of births to women of a specified age or age group per 1,000 women in that age group in a given year.

$$\left(\frac{\text{Number of resident live births per age group}}{\text{Female population per age group}} \right) \times 1{,}000$$

FETAL DEATH – Fetal death refers to fetal demise at 20 or more completed weeks of gestation. Counts reflect only in-state occurrences to Connecticut residents.

- Fetal mortality rate: The number of fetal deaths per 1,000 live births plus fetal deaths. The fetal death rate refers to the number of fetal deaths occurring among the population of a given geographical area during a given year per 1,000 total births (live births plus fetal deaths).

$$\left(\frac{\text{Number of fetal deaths}}{\text{Number of live births} + \text{Number of fetal deaths}} \right) \times 1{,}000$$

GESTATIONAL AGE - The obstetric estimate of the infant's gestation at delivery in completed weeks.

- Preterm Delivery - A live birth or fetal death that occurs before the completion of the 37th week of gestation.

- Preterm rate – The number of live births born preterm among all live births in a given year multiplied by 100%.

$$\left(\frac{\text{Number of live births born} < 37 \text{ completed weeks gestation}}{\text{Number of live births}} \right) \times 100\%$$

- Term Delivery - A live birth or fetal death with delivery at 37 completed weeks or greater.

LOCAL HEALTH DISTRICT (LHD) - A local governmental entity consisting of two or more towns that is responsible for the public health of its constituent towns. See Appendix II for a listing of the health districts in existence in Connecticut as of July 1 of the current reporting year.

HISPANIC/LATINO ETHNICITY: Refers to people whose origins are from Spain, the Spanish speaking countries of Central America, South America, and the Caribbean, or persons of Hispanic/Latino origin identifying themselves as Spanish, Spanish-American, Hispanic/Latino, Hispano, Latino, and so on. For vital events, "Hispanic, Latino/a, or Spanish origin" refers to a person of Mexican, Puerto Rican, Cuban, South or Central American, or other Spanish culture or origin – regardless of race.

INFANT DEATH - Death occurring within the year of life.

- Infant mortality rate (IMR): The number of infant deaths per 1,000 live births in a given year.

$$\left(\frac{\text{Number of infant deaths}}{\text{Number of live births}} \right) \times 1{,}000$$

- Neonatal deaths - Deaths occurring within the first 27 days of life.

- Neo-natal mortality rate - The number of deaths during the first 27 completed days of life occurring among the live births in a given year per 1,000 live births.

- Post-neonatal deaths – Deaths those occurring from 28-365 days of life.

- Post-neonatal mortality rate - The number of deaths occurring from 28-365 days of life occurring among the live births in a given year per 1,000 live births.

INFANT SEX – Biological sex as identified at time of birth.

INITIATION OF PRENATAL CARE – The first time a mother sees a provider for care of her pregnancy.

- Early Prenatal Care – Initiation of prenatal care during the first trimester.
- Late or No Prenatal Care – Initiation of prenatal care during the third trimester or not at all.
- Early Prenatal Care Initiation Rate - The number of pregnant women initiating prenatal care in the first trimester among all women delivering a live birth in given year multiplied by 100%

$$\left(\frac{\text{Number of live births to women initiating prenatal care during first trimester}}{\text{Number of women delivering live births}} \right) \times 100\%$$

LINKED BIRTH-INFANT DEATH - Infant deaths that have been successfully linked to the birth record thereby allowing information from the birth record, such as maternal and perinatal characteristics, to be used in the analysis of the infant death.

LIVE BIRTH ORDER - The number of children born alive to the same mother inclusive of the current birth (first born, second born, third born, etc.).

LIVE BIRTH - The complete expulsion or extraction from the mother of a product of conception, regardless of the duration of pregnancy; after such separation, the product shows signs of life (e.g., heartbeat, pulsation of the umbilical cord, or movement of voluntary muscles) that is more than transient or fleeting.

- Live birth rate – see BIRTH RATES

NATIVITY – Classification of a person based on their country of birth.

OCCURRENT - Place of occurrence represents the geographic area in which the event occurred regardless of the place of residence of the individual.

PATERNITY STATUS – Paternity is the legal identification of the father of a child. If parents are married at the time a child is born, the law presumes that the husband is the father of the child. If the parents are not married, then paternity needs to be established through a legal process. By establishing paternity, the father's name will be added to the child's birth certificate, and he will gain legal rights to his child, as well as responsibilities for supporting the child.

- Acknowledgement of Paternity (AOP) -- If a mother is not married at the time a child is born and has not been married at any time between conception and the birth of the child, no father will be named on the birth certificate unless both parents complete an Acknowledgement of Paternity (AOP) or unless ordered by a court of competent jurisdiction. The AOP form is a sworn statement voluntarily completed by the parents at the hospital at the time the child is born, or sometimes at a later date, that affirms that the named father is the biological father. An AOP has the same force and effect as a court ordered judgment of paternity. Once the AOP is completed and processed, the father's name is included on the child's birth certificate.

PAYER FOR DELIVERY – Payer or source of payment for the delivery of the infant(s).

PLURALITY - The number of siblings delivered in a single pregnancy; commonly expressed as singleton or multiple. A singleton pregnancy results in a single delivery, while a multiple pregnancy results in twins, triplets, or higher order deliveries.

- Singleton delivery - One live birth or fetal death is delivered during a pregnancy.
- Multiple delivery - More than one (twins, triplets, or higher) live birth or fetal death is delivered in the same pregnancy and may include mixed outcomes (live births and fetal deaths).

POPULATION ESTIMATES – Annual population estimates are published by the U.S. Census Bureau's Population Estimates Program (PEP). These estimates by age, sex, race, and ethnicity are used as the denominators for the calculation of population-based indicators, such as fertility rates, death rates, and teen birth rates.

- Vintage – Refers to the year that the annual population estimates are published. The *Registration Reports* use the original vintage (i.e., first published) of the population estimates for all rate calculations.

PRETERM – See Gestational Age

RACE - A population of individuals who identify themselves from a common history, nationality, or geographical place. When responses in the "race" line item on vital records are associated with the definition of Hispanic/Latino origin, they are re-coded to "white race," as described in the National Center for Health Statistics instruction manuals for coding vital records. Individuals identifying themselves as either "White," "Black/African American," or "Other" race can be of any ethnic group. See also "Hispanic/Latino ethnicity."

RELATIVE STANDARD ERROR (RSE) – Measures statistical reliability of an estimated rate. It is calculated as a percentage formulation of the ratio of the standard error of an estimate to the estimate itself.

$$\left(\frac{\text{Standard Error of Rate Estimate}}{\text{Rate Estimate}} \right) \times 100\%$$

RESIDENT – Place of residence represents the geographic area in which the address reported as the place of residence at the time of the event is located.

TEEN BIRTH: A live birth delivery in a woman under 20 years of age on the date of delivery.

- Teen birth rate - The number of live births to women in aged 15-19 years per 1,000 females in the population in the same age group. *Note that live birth rates do not include all pregnancies. Fetal deaths, induced terminations, and early miscarriages are not included. The teen birth rate is not the same as the teen pregnancy rate.*

$$\left(\frac{\text{Number of births to females aged } 15-19}{\text{Female population aged } 15-19} \right) \times 1000$$

TIMING OF PRENATAL CARE – See Initiation of Prenatal Care

TRIAL OF LABOR - see Cesarean Delivery

TRIMESTEROF PREGNANCY - One-third of the total gestation period of a full-term pregnancy, or 13 weeks per trimester. The “third trimester” classification comprises pregnancies of 27 or more weeks gestation. The weekly count begins on the first day of the last menstrual period.

UNDERLYING CAUSE OF DEATH - See cause of death.

VINTAGE - See population estimates

WIC – Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) that provides federal grants to states for supplemental foods, health care referrals, and nutrition education for low-income pregnant, breastfeeding, and non-breastfeeding postpartum women, and to infants and children up to age five who are found to be at nutritional risk.

APPENDIX IV
COLLECTION of HISPANIC ORIGIN and RACE

Race and Hispanic Ethnicity: Race and ethnicity are self-identification data items in which respondents choose the race or races with which they most closely identify and indicate whether or not they are of **Hispanic, Latino/a, or Spanish** origin. Race and ethnicity are considered separate and distinct identities.

Please complete both items.

Definition of Hispanic, Latino/a, or Spanish Origin: Hispanic origin can be viewed as the heritage, nationality group, lineage, or country of birth of the person or the person's parents or ancestors before their arrival in the United States. People who identify their origin as Hispanic, Latino, or Spanish may be any race.

- "**Hispanic, Latino/a, or Spanish origin**" refers to a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin – *regardless of race*.

3b. Is the Mother Spanish/Hispanic/Latina?

- ❑ No, not Spanish/Hispanic/Latina
- ❑ Yes, Mexican, Mexican American, Chicana
- ❑ Yes, Puerto Rican
- ❑ Yes, Cuban
- ❑ Yes, other Spanish/Hispanic/Latina:

_____
(e.g. Spaniard, Salvadoran, Dominican, Columbian)

Definition of Race Categories:
A person may indicate self-identification with two or more races by selecting multiple race categories.

- "**White**" refers to a person having origins in any of the original peoples of Europe, the Middle East, or North Africa. It includes people who indicate their race(s) as "White" or report entries such as Irish, German, Italian, Lebanese, Arab, Moroccan, or Caucasian.
- "**Black or African American**" refers to a person having origins in any of the Black racial groups of Africa. It includes people who indicate their race(s) as "Black, African American, or Negro"; or report entries such as African American, Kenyan, Nigerian, or Haitian.
- "**American Indian and Alaska Native**" refers to a person having origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment.
- "**Asian**" refers to a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.
- "**Native Hawaiian and Other Pacific Islander**" refers to a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

3c. Mother's Race: Please check one or more races to indicate what she considers herself to be.

- ❑ White
- ❑ Black or African American
- ❑ American Indian or Alaska Native:

_____
(name of enrolled or principal tribe)

Asian
- ❑ Asian Indian
- ❑ Chinese
- ❑ Filipino
- ❑ Japanese
- ❑ Korean
- ❑ Vietnamese
- ❑ Other Asian: _____
(e.g., Thai, Cambodian, Malaysian)

Pacific Islander
- ❑ Native Hawaiian
- ❑ Guamanian or Chamorro
- ❑ Samoan
- ❑ Other Pacific Islander:

_____

- ❑ Other Race:

_____

APPENDIX V
SMALL NUMBERS

Risk of identity disclosure is a known concern when reporting health outcomes in tabular format for small geographies or small population groups. The publication of small numbers within health outcome tables creates the potential for disclosure of personally identifiable information or protected health information, either through evaluation of the tables in isolation or through subsequent linkage with other datasets that contain additional identifying information.[73-76]

Release of rates and proportions with low statistical reliability is another concern associated with publication of sparse data for small geographies or population groups. Statistical reliability refers to the consistency, or stability, of a rate. The statistical reliability of a rate decreases as the number of disease events and the size of the population in which those events occurred decreases. Publication of rates based on small numbers may lead to misinterpretation or misuse of the data.[77-79]

A tradeoff exists between presenting data at the highest level of detail required to ensure high utility of data published in the *Registration Reports* to support DPH's mission and a) protecting the identity and health information of individuals in this report and b) providing estimates that are sufficiently reliable for surveillance and analyses. Due to the nature of the *Registration Reports* containing vital event information that is fundamental to public health, government, business, and individuals, the suppression for small numbers in the *Reports* is less strict than the suppression typically applied to release of public health data by CT DPH.

Beginning with 2016, a revised set of suppression rules are used in the *Registration Reports* to address the first issue of disclosure risk associated with release of small numbers. In Connecticut, birth and fetal death data are confidential and are subject to suppression while death data are not confidential and are not suppressed.[73] In all instances of suppression, both counts and rates are censored since rates can be combined with knowledge of denominator values to back-calculate counts.

- Primary suppression:
  - Single year counts and rates at the state-, county-, and town-level that include stratification by limited race and ethnicity groups are not suppressed.
  - Counts and rates at the state-level stratified by three or more demographic or health outcome indicators are suppressed for cell values 1-4 or population denominators less than 100.
  - Counts and rates for geographies below the county-level stratified by two or more demographic or health outcome indicators are suppressed for cell values 1-4 or population denominators less than 100 when but are not suppressed when counts and rates are aggregated for 3 or more years.
- Secondary suppression:
  - Suppression of additional *Report* Table cells to prevent back-calculation of counts to which primary suppression has been applied.
- Additionally, although counts of zero or rates of 100% are released throughout the *Report* Tables, they are also suppressed if they are deemed to potentially allow for attribution of sensitive health outcome to an entire population group or area, a phenomenon known as group disclosure.
  - Rates for paternity status below the state-level are provided in 5% ranges to minimize group disclosure.

- "Unknown" indicator values are not suppressed unless utilized for secondary suppression.
- Suppression is denoted by an "*s*".

The second issue associated with small numbers, low statistical reliability, is addressed in the *Registration Report* through application of grey shading to cells with rates that have a high standard error value relative to the rate itself. The ratio of these two values multiplied by 100%, known as the Relative Standard Error (RSE), is a widely-used indicator of statistical reliability.[80] Larger values indicate poorer reliability and thus a greater chance that the rate calculated from the data is a poor approximation of the true, underlying population rate. For *Registration Report* purposes, all rates with RSE > 30% are flagged using grey shading. Typically, statistics with RSEs of 25-30% would be suppressed to prevent misinterpretation and misuse; however, the nature of the *Registration Reports* as providing the official vital statistics for the state warrants full reporting of vital events and associated rates. Gray shading serves as an alternative method for discouraging misinterpretation and misuse.

APPENDIX VI
STATISTICAL METHODS

Standard statistical approaches for descriptive epidemiology are used in both the *Registration Report* Tables and the Population Health Highlights. Population Health Highlights may feature data that have not yet been included in *Registration Report* Tables. These data are available upon request from the DPH Surveillance Analysis and Reporting Unit. Figures and tabulations for Population Health Highlights are produced through R programming. *Registration Report* Tables are programmed in SAS software.[81,82] The epidemiological analyses fall into one of three categories: person-based (for a single point in time), geographic comparisons (for a single point in time) or trend (time-based) analyses, as described below.[83]

Person-based Comparisons

Person-based analyses, whereby rates of risk factors or poor health outcomes are compared among population groups for a single point in time,[84] are used frequently throughout the *Registration Report*. Person-based comparisons groups are defined by specific attributes, such as race, ethnicity, and age. The timeframe that defines the point in time for analysis varies throughout the *Report*. Most comparisons between groups are made for the most recent year of events. On occasion, counts of rare outcomes and risk factors are known to be too low for single-year reporting due to inadequate levels of statistical reliability. For these tables, the data for multiple years are combined to provide person-based comparisons using a three- or five-year period as the point in time for analysis.

In Population Health Highlights, rates between races and ethnicities for health outcomes of interest at a defined point in time are compared using Chi-Square Tests of Independence.[84] Results of pairwise comparisons between any two groups are inferred as significant based on $p<0.05$ after Bonferroni-adjustment for multiple comparisons.[85] Disparity ratios and associated Bonferroni-adjusted standard errors are calculated for multiple health indicators with Non-Hispanic White serving as the referent group. Conclusion of a higher or lower risk compared to non-Hispanic White for each comparison group is made based on exclusion of unity from the disparity ratio 95% confidence intervals .[86] Disparity Ratios for which the lower confidence limit > 1 indicated an elevated rate and those with upper confidence limits < 1 indicated a lower rate.[87]

Although trend analyses (described below) also evaluate health outcome patterns by population group, methodologies are different than those used for single point in time comparisons.

Geographic Comparisons

The *Registration Reports* provide geographic comparisons of rates for select indicators. Similar with person-based comparisons, geographic comparisons are made for a single point in time for which the definition varied from a one-year to a five-year period.

Connecticut-to-U.S. comparisons are a standard element of Population Health Highlights and have been available since 2018. These analyses are based on results of Chi-Square tests of independence to compare the rate for a specific health indicator in Connecticut to the national rate for the most recent year. Conclusion of a significant difference between Connecticut's rate and the national rate is based on $p< 0.05$. National rates are retrieved from NCHS's natality files via CDC's online data portal (CDC Wonder). Data quality caveats observed from any national rates in the Population Health Highlights are described in the *Birth Data Files' User Guide* provided on the online vital statistics data portal.[88]

Population Health Highlights provided Connecticut's state rank for poor health outcomes and risk factor rates for the most recent year. Washington D.C. is included in the state rankings such that the geographic area with the least favorable rate will rank 51st. Data used for ranking are derived from CDC Wonder or NCHS's National Vital Statistics Reports. Although not a geographic comparison, rates in Connecticut are also compared to Healthy People 2020 goals for the most recent year. Conclusions of a rate different than the Healthy People goals are based on exclusion of the goal from the 95% confidence interval for the Connecticut rate for the index health indicator.

Five-year town-level teen birth rates are compared to the state rate in *Report* Table 17 and have been available in the *Registration Report* Tables since 2011.[89] Five-year figures are used to provide a reliable basis for estimating teen birth rates as single-year figures at the town-level pose risk of identity disclosure and low reliability of rates for many towns (see **Appendix V**). Rates by town are calculated using the 2010 Decennial Census population estimates[90] as 1) annual estimates by town with demographics are not currently available and 2) ACS 5-year estimates have margins of error by age and sex that are too large at the town level to provide stable rates. Statistical comparisons were not made for towns with fewer than 15 births unless the number of expected births based on the state rate was greater than or equal to 15. The consideration of "expected counts" in defining this threshold allows us to evaluate low but stable town rates which are based on large denominators and small numerators. Two statistical tests for rate differences are provided to answer two different questions. Single-Test seeks to determine if a town rate is significantly different ($p < 0.01$) than the state rate when considering only that single comparison to the state rate. Multi-Test seeks to determine if a town rate is significantly different ($p < 0.05$) than the state rate when analyzed simultaneously for all 169 towns in Connecticut after Bonferonni adjustment for multiple comparisons.[85] The Wilson Score method is used for calculating the confidence intervals around the town and state rates as it provides more precise endpoints when the ends of the intervals are close to 0 or 1, as is common with town-level teen birth rates.[91]

Trend Analyses

The final type of epidemiological analysis used in the *Registration Report* evaluates trends, or patterns over time, in the annual rates of health indicators in the Population Health Highlights. The timeframes for trend assessment begin with the year earliest compatible data availability and end with the focus year of the Registration Report. Although historical data spanning many decades exist for all Connecticut vital event datasets, the year of earliest availability used for trend analyses in the *Report* constitute those for which data are consistently defined and formatted with the most recent data year: 2005 for Connecticut deaths and 2003 for Connecticut births and fetal deaths.

Joinpoint regression analysis is used for statistical assessment of trends.[92] Joinpoint regression determines the optimal number and location of "joinpoints" which are points in a time series for which there is a significant difference in the rate of change over time during one time period compared to other time periods in the series. Selected models with more than one joinpoint are evidence of a change in the slope of the regression line for at least two separate time periods in the series.[93]

The optimal model, or number of joinpoints, is selected for inference using results of permutation tests using $p < 0.05$ for significance testing for individual tests. Minimum and maximum numbers of joinpoints for consideration are based on the number of data years included in the analysis.[94] Where appropriate, detail on trends for individual segments based on selected models are provided. Average annual percentage changes (AAPCs), which allow for overall assessment of trends

patterns over an entire time series, regardless of dynamic slope patterns for segments therein, are provided when significantly different than null ($p < 0.05$).[95]

Trends for rates of target health outcomes are evaluated for the entire state of Connecticut, for individual races and ethnicities in Connecticut, and for the U.S. Races and ethnicities for which a substantial portion of the time series' annual rates have RSE > 30% are not analyzed and are excluded from figures. National time series are derived from the same datasets used for geographic comparisons described above. Analyses of U.S. trends in these *Reports* are strictly administered and interpreted by DPH's internal SAR-based analysis techniques and have not been examined for verification by CDC for the purpose of the Population Health Highlights.

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REGISTRATION TABLES 2018

The following 2018 Registration Report Tables are available electronically on the CT Department of Public Health website at www.ct.gov/dph by searching for 'Vital Statistics' or 'Registration Reports' in the search field.

TABLE 1 2018 Estimated Population of Connecticut by Age and Sex

TABLE 2 Top 10 Baby Names for Connecticut Resident Births, 2018

VITAL EVENT COUNTS

TABLE 3 Births and Birth Rates by Place of Residence and Mother's Race and Ethnicity and Births by Place of Occurrence, 2018

TABLE 4 Deaths and Mortality Rates by Place of Residence and Race and Ethnicity and Deaths by Place of Occurrence, 2018

TABLE 5 Fetal Deaths and Mortality Rates by Place of Residence and Mother's Race and Ethnicity and Fetal Deaths by Place of Occurrence, 2018

TABLE 6 Infant Deaths and Mortality Rates by Place of Residence and Mother's Race and Ethnicity and Infant Deaths by Place of Occurrence, 2018

TABLE 7 Infant, Neonatal, and Post-neonatal Deaths and Mortality Rates by Place of Residence and Mother's Race and Ethnicity, 2018

TABLE 8 Marriages by Place of Occurrence and Selected Characteristics, 2018

POPULATION RATES related to Pregnancy/Birth

TABLE 9 Annual Births and Birth Rates by Place of Residence, 2010-2018

TABLE 10 Annual Births by Mother's Age, Mother's Race and Ethnicity, and Birth Order, 2000-2018

TABLE 11 Annual Birth Rates by Mother's Age and by Mean Age at First Birth by Race and Ethnicity, 2000-2018

TABLE 12 Annual Fertility Rates by Mother's Age, Mother's Race and Ethnicity, and Birth Order, 2000-2018

TABLE 13 Annual Fetal Deaths and Death Rates by Mother's Age, 2000-2018

TABLE 16 Annual Teen Births and Teen Birth Rates by Mother's Race and Ethnicity, 2014-2018

TABLE 17 Five-year Teen Births and Teen Birth Rates by Town of Residence, 2014-2018

PERCENTAGES for Births by Indicators, Statewide

TABLE 18 Births by Gestational Age and Mother's Race and Ethnicity by Infant Sex, Plurality, and Other Selected Characteristics of Delivery and Infant Care, 2018

TABLE 19 Births by Birthweight and Mother's Race and Ethnicity by Infant Sex, Plurality, and Other Selected Characteristics of Delivery and Infant Care, 2018

TABLE 20 Births by Mother's Age and Mother's Race and Ethnicity by Selected Maternal Social Determinants of Health and Risk Factors, 2018

TABLE 21 Annual Counts for Selected Birth Indicators by Mother's Race and Ethnicity, 2000-2018

TABLE 22 Annual Rates for Selected Birth Indicators by Mother's Race and Ethnicity, 2000-2018

PERCENTAGES for Births by Indicators for geographies below the state level

TABLE 23 Births by Gestational Age, Birthweight, and Plurality by Place of Residence and Mother's Race and Ethnicity, 2018

TABLE 24 Births by Selected Parental Social Determinants of Health and Risk Factors by Place of Residence and Mother's Race and Ethnicity, 2018

TABLE 25 Births by Selected Pregnancy Risk Factors and Maternal Characteristics by Place of Residence and Mother's Race and Ethnicity, 2018

TABLE 26 Births by Selected Characteristics of the Delivery and Infant Care by Place of Residence and Mother's Race and Ethnicity, 2018

DEATHS

TABLE 27 Deaths by Cause of Death, Age at Death, Sex, and Race and Ethnicity, 2018

TABLE 28 Deaths and Mortality Rates for the Top Five Causes of Death by Age and Sex, 2018

FETAL DEATHS

TABLE 29 Fetal Deaths by Cause of Death, Gestational Age, and Mother's Race and Ethnicity, 2018

TABLE 30 Fetal Deaths by Birthweight and Gestational Age by Mother's Race and Ethnicity, Plurality, and Other Selected Characteristics, 3-year aggregate, 2016-2018

INFANT DEATHS

TABLE 31 Infant, Neonatal, and Post-neonatal Deaths by Cause of Death and Race and Ethnicity, 2018

TABLE 32 Infant Mortality Rates by Infant's Age and Infant's Race and Ethnicity, 2005-2018

TABLE 33 Linked Birth-Infant Death Mortality Rates by Infant's Age and by Mother's Race and Ethnicity, 2005-2018